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CEREBRO-SPINAL FEVER: AN ANALYSIS OF FIFTY CASES.[1]

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Cerebro-spinal fever is a specific disease due to infection by the meningococcus, occurring in sporadic and epidemic form, manifesting itself as an initial septicæmia, commonly with secondary localization in the meninges.

Ætiology.

In regard to the mode of entrance, there seems indisputable evidence that the disease starts as a naso-pharyngitis. In over 90% of our cases there was definite inflammation of the throat on examination, although in only 40% was a history of cold or sore throat obtainable. Our patients were almost all females over 14 years of age, one-third being over 40. In over 60% there was a definite history of close contact with soldiers, who, in many cases, had been convalesced home from camp or base hospital after conditions such as influenza, bronchitis, etc.

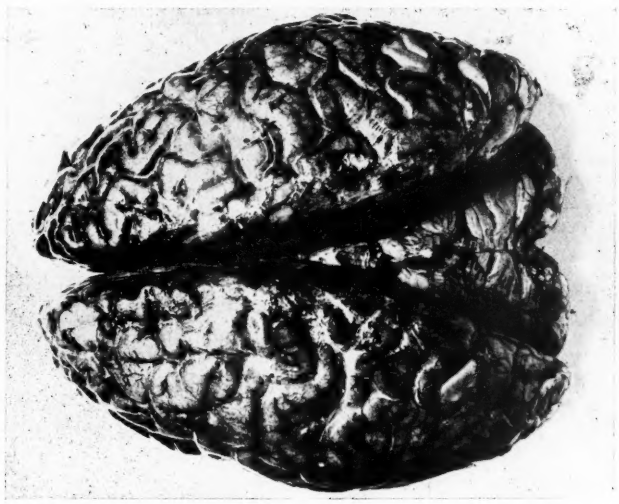


Fig I.
Acute Cortical Type, showing Inflammation of Leptomeninges, with Pus Deposition in Sulci.

Pathology.

A post-mortem examination was made in 22 of our cases; the following were the usual findings:—

Brain.—On removing the skull cap some increased tension of the *dura mater* was usually seen. Incision of the dura rarely demonstrated much subdural fluid, and never adhesions or pus deposition in the subdural space.

The *leptomeninges* always showed evidence of inflammation, its incidence varying according to the acuteness or chronicity of the case. The findings could roughly be divided into three types, those in which the inflammation was mainly cortical, those in which the base of the brain was chiefly affected, and a mixed type, with involvement of both.

The cortical type (Fig. I.) was seen mainly in the fulminating and very acute cases, in which the inflammation principally affected the cortical leptomeninges. Here, intense engorgement, diffuse pink cortical staining, due to injection of the pial vessels, loss of sheen of the arachnoid, with gelatinous lymph to definite pus deposition along the sulci, constituted the pathological findings. The base of the brain was also usually affected to a slight extent.

The pure basal type was uncommon, and generally associated with a fading cortical inflammation. In the cases which had become sub-acute (three to six weeks), thick, fibrinous pus was found filling the *cisternae pontis* and *magna*, giving rise to a true posterior basic meningitis. This caused a blockage between the subarachnoid cisternæ and the spinal theca, and also a relative or absolute obstruction of the foramina of Magendie and Luschka, with the production of internal hydrocephalus. These are the two factors which cause dry lumbar puncture.

The mixed type (Fig. II.) comprised the majority of cases, especially of the ordinary acute form, in which the inflammation was found to be both cortical and basal, with more or less pus in the *cisternae magna*, *pontis* and *basilis*, often surrounding the pituitary body and extending over the anterior and lateral surfaces of the pons and medulla on to the vermis and inferior and postero-superior surfaces of the cerebellar lobes. In the more chronic of these cases there was some degree of obstruction to the foramina, with ventricular dilatation, but the yellowish white, dense, opaque bands bands following the cortical vessels, as described by Heiman and Feldstein,[1] were not observed.

The brain substance seemed to be œdematous; the

[1] Read at a meeting of the Victorian Branch of the British Medical Association on October 6, 1915.

vessels were engorged, and, on section, showed as hæmorrhagic foci.

Ventricular System.—On longitudinal section in the more acute cases, the ventricles contained a variable amount of turbid fluid. Actual dilatation (Fig. III) in patients dead within seven days of the onset was rare, but thereafter dilatation was proportional to the chronicity of process. The ependyma in acute cases was softened and œdematous, and the choroid plexus engorged.

In the more chronic cases, with definite fibrinous pus at the base, marked internal hydrocephalus was a constant finding, the fourth ventricle (Figs. IV. and V.) especially was dilated out of all proportion. Longitudinal section of the fourth ventricle showed an equilateral triangle, with its base formed by ventricular floor, and the sides by the superior and inferior medullary *vela*, which were much lifted and stretched, the apex projecting high into the cerebellum. The aqueduct of Sylvius shared the general dilatation, as did the third ventricle, which however, owing to its anatomical relationship, was dilated only towards its weak, anterior-inferior angle, the *tuber* and *lamina cinerea* being stretched and bulging. The foramina of Munro were also enlarged, while the lateral ventricles showed general expansion and increase of cerebro-spinal fluid. They frequently contained thick pus. The maximum dilatation was in the posterior horn, an important feature in regard to operative interference.

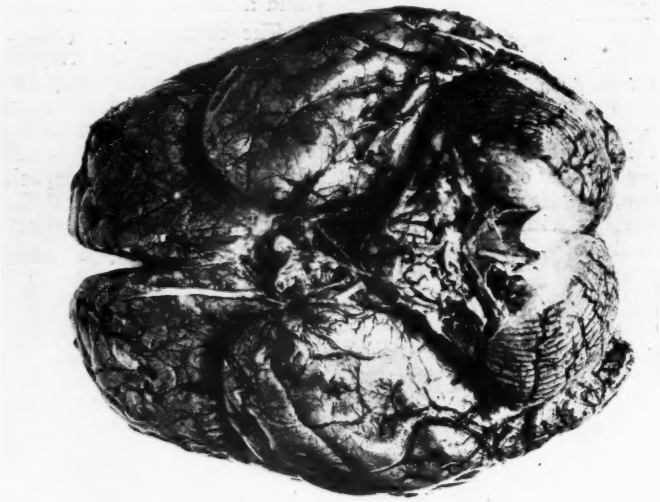


Fig. II.
Mixed or Cortico-basal Type, showing Basal Distribution of Pus.

To demonstrate the condition of the ventricular system, a series of cases at autopsy were trephined over Keen's point, and cerebro-spinal fluid withdrawn from the posterior horn of the lateral ventricle, and an equivalent amount of methylene blue injected. In all cases this reached all parts of the ventricular system, proving that local loculation of fluid and interventricular blockage and adhesions did not exist. In the more chronic cases, with definite basal meningitis, the methylene blue reached the cisternæ much less freely than in the acute cases. This indicates that relative blockage of foramina of Magendie and Luschka existed, while in our most chronic case, the blockage was absolute.

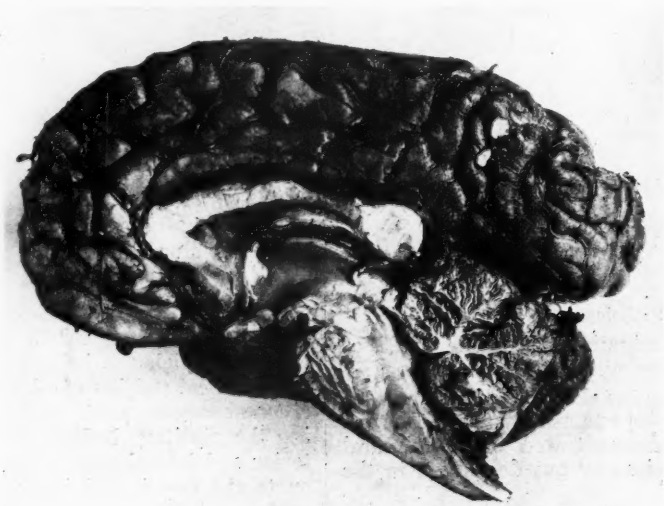


Fig. III.
Mixed or Cortico-basal Type, Longitudinal Section showing Earliest Tendency to Dilatation of Ventricular System (practically normal).

On reviewing the literature, it was found that we had been repeating the experiments of Goeppert[2] with similar results. So far as we have been able to ascertain, the extreme dilatation of the fourth ventricle has not been noted in the pathology of previous epidemics.

According to the microscopic report, the cortical inflammation consisted of dilatation and engorgement of the smaller vessels, leucocytic and endo-

thelial cell reaction causing macroscopical opacity of the leptomeninges along the larger sulci on the cortex, and minute hæmorrhages into the grey matter of the cortex and into the subarachnoid space. These changes, combined with cloudy swelling of brain substance, constituted an acute, superficial encephalitis, extending into the grey matter as far as the limit of the deeper sulci. At the base of the brain there was dilatation of vessels in circle of Willis, with occasional rupture and gross hæmorrhage into the sub-arachnoid space, and leucocytic reaction, with pus formation, in the basal cistern and distension of the ventricles with fluid containing leucocytes and diplococci.

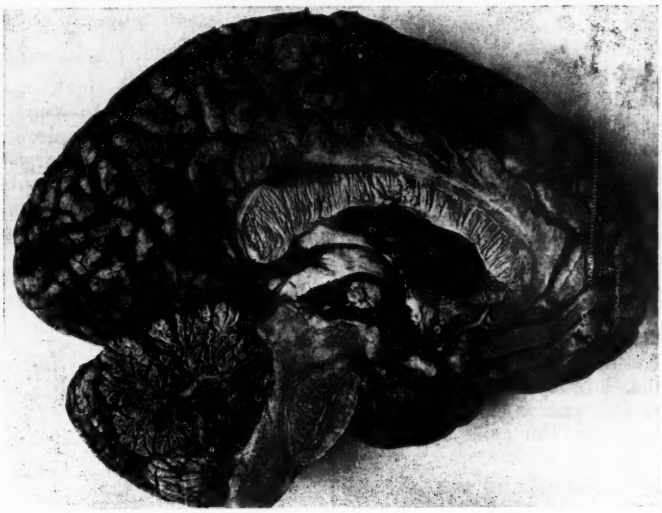


Fig. IV.
Sub-acute Case with Posterior Basic Meningitis, and Internal Hydrocephalus, showing Extraordinary Dilatation of the 4th Ventricle. An Indian Ink Preparation of the Ventricular system was made.

Pathology of Other Organs.

The accessory nasal sinuses were specially examined in 15 cases at autopsy. In the sphenoids, no occlusion of the ostia was found, and all except three were quite clear of inflammation. Of these, two were acutely inflamed with a boggy, thickened mucosa, covered with yellowish pus. In one case of undoubted cerebro-spinal meningitis, Gram positive diplococci (pneumococci) were found on microscopical examination of the smears. In the other case, chronic polypoid sphenoiditis was found. There was acute ethmoiditis in two cases, and chronic hypertrophic ethmoiditis in three others; the remainder were normal. The antrum was inflamed in two cases; in one an acute empyema was seen, with thick, engorged, almost necrotic linnig membrane and pus under definite tension. A smear from the pus revealed a mixed infection. In the other there was a mild infection, with some muco-pus. Rhinitis was noticeable *post mortem* in four cases; in one case it was very severe. No mastoiditis or otitis media was observed.

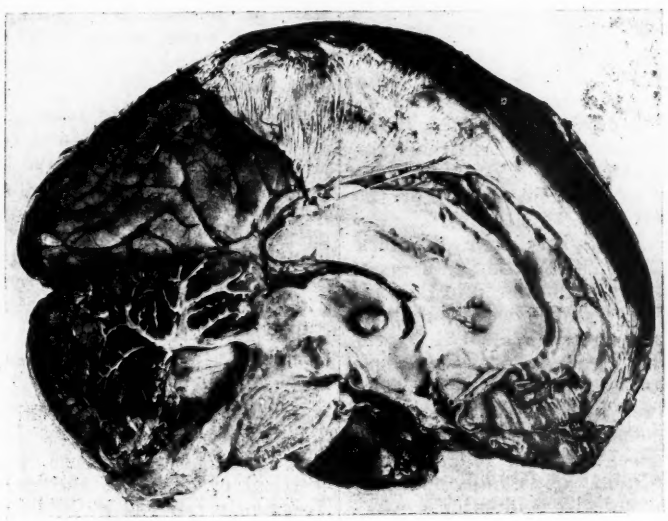


Fig. V.
Sub-acute Case with Posterior Basic Meningitis, and Internal Hydrocephalus, showing Excessive Dilatation of the 4th Ventricle. Thick Fibrinous Pus is Covering the Pons.

An analysis of these cases brings us to the question of trans-nasal infection. The suggestion of Peters[5] led it to be hoped that a considerable number of cases might be benefited by drainage of the infected sphenoidal sinuses, with occluded ostia. Clinical investigation did not encourage this hope, though in many cases diffuse rhinitis was present. Neither do our fifteen autopsies. None of these had occluded sphenoidal ostia, and there was uniform absence of any signs of active inflamtion above the cribriform plate and over the sphenoidal roof. It is conceivable that, on the analogy of transtegmenal infection from tympanic or mastoid sepsis, which does occur with wide perforation of the *membrana tympani* and unblocked *additus*, meningococcal infection might traverse the sphenoidal roof, even with a patent ostium, but we feel justified in expecting that the dura would yield evidence, by inflammation

and perhaps adhesions to the pia-arachnoid, of having been tranversed by the infection, as it commonly does over the tympanum or antrum.

The lungs were commonly the site of hypostatic congestion, while in about 35% of cases there was a definite terminal infective pneumonia, as evidenced by consolidation, greyish red section, and friability. Acute pleurisy was not noticed.

Heart.—The myocardium was frequently pale, and very commonly of increased friability; dilatation of heart or its orifices was not marked. No case of recent endocarditis or valvitis was seen. Pericarditis was noted twice, and in a third case the outer surface of parietal pericardium was covered by a thin layer of pus, which contained intracellular diplococci. The pericardium itself was injected, and there was increased serous effusion in the pericardial sac. The microscopical report of one case, in which pericarditis was present, was: Exudate of fibrin between the visceral and the parietal pericardium, with adhesions, leucocytic reaction, new vessels budding into the fibrinous layer, and cloudy swelling of the heart muscle, the cells appearing granular and staining diffusely.

The Arteries.—The *tunica intima* did not take up the stain in the microscopical sections. Atheroma was frequent, being present in five patients under 40 years of age. It was then associated with syphilitic changes in other organs.

Gastro-intestinal Canal.—Injection of the vessels, hæmorrhagic erosion and diffuse staining of the mucosa were noted, and some swelling and increased pigmentation of the Peyer's patches were seen.

The liver was somewhat enlarged (usually about 50 ozs.), with a smooth, shiny capsule; on section, a characteristic "nutmeg" appearance was present in 75% of our cases, consisting of circular, brownish areas on a yellowish background of intervening liver tissue. Friability was common. Microscopically, there was marked cloudy swelling of the liver cells, and great engorgement of the intralobular veins, giving rise to the macroscopic "nutmeg" appearance, possibly due to terminal failure of the right side of the heart.

The spleen was usually slightly enlarged, dark red and friable, especially in the more acute cases.

No constant findings were encountered in the kidneys; they were more or less congested in about 25% of cases. Mild pyelitis, as evidenced by injected vessels, was present in about 36%. Occasionally, swelling of the mucosa and actual pus formation was seen. Bilateral pyelonephritis occurred once. Multiple minute abscesses under the cortex, lined by layers of leucocytes, with inflammatory changes in the pelvis of kidney and cloudy swelling, were detected on microscopical examination.

In over 50% of cases injection of the vessels of the bladder was present, accompanied in some cases by definite swelling and engorgement of the mucous membrane. Petechial hæmorrhages were not uncommon. Both congestion and hæmorrhage were most marked in the neighbourhood of the trigone. In one case there was severe purulent cystitis, with sloughing mucous membrane.

The cause of death in the acute cases was sepsis or some complication, such as pneumonia or pericarditis, while in the more chronic cases internal hydrocephalus appeared to be a factor of great importance. These are also described by Sophian[4] as the common causes of death.

Symptomatology.

The cases varied much in severity, and could be roughly divided into four classes: fulminating, acute, sub-acute or chronic, and abortive.

Considering the ordinary acute type, the three stages—naso-pharyngeal, septicæmic and meningitic, described by Lundi, Thomas and Fleming[5]—could be clearly differentiated. Almost all of these acute cases showed a first stage of naso-pharyngeal inflammation, which was not always accompanied by symptoms of sore throat. The possibility that this stage is due to another infection on which the meningococcal infection later becomes engrafted, must be considered. The septicæmic stage was the stage at which a certain number of our patients was admitted, and on lumbar puncture these cases gave clear fluid under pressure. Pus and diplococci were frequently not demonstrable in the fluid, but it almost always yielded a definite potassium permanganate reduction test. The manifestations of this stage were fever, pains in the back and limbs, chilliness, rigors, nausea, vomiting, irritability, headache, hyperæsthesia, rash and herpes. This stage passed on to the third, or meningeal stage, in which the majority of our patients were admitted. Turbid fluid under pressure, containing pus and diplococci, was obtained on lumbar puncture. This stage was characterized by definite nervous symptoms, *i.e.*, stiffness of neck, head retraction, flexed limbs, delirium or coma, exaggerated reflexes, marked Kernig's sign, and retention or incontinence of urine and fæces.

In the fulminating cases, these stages were not so manifest. Delirium and coma followed the onset rapidly. In the abortive type, meningeal symptoms were sometimes very slight. In the sub-acute and chronic cases, the meningeal stage was prolonged; the onset of internal hydrocephalus was denoted by a dry or diminishing lumbar puncture, increasing drowsiness, dilated pupils, rising blood pressure, nystagmus, variable McEwan's sign and rarely optic neuritis.

Symptoms.

The onset was usually accompanied by headache, vomiting and chills. In only 40% of the cases a history of naso-pharyngeal catarrh was obtainable. The headache was intense, usually frontal, at times vertical or occipital, and very persistent. It was frequently relieved by lumbar puncture. Vomiting was very common, and was either of an explosive nature, associated with nausea, or effortless, without nausea. In the latter cases the vomitus was almost invariably green. Chills were commonly present, and varied from hot and cold feelings to actual rigors. Pains in the extremities and trunk, photophobia, and joint involvement were variably noted.

Signs.

The face was frequently flushed, sometimes pallid. Vaso-motor instability frequently was a marked feature. The head was often extended and the limbs flexed. The mental condition was one of irritability during the early stage; later there was delirium, active or mild. In the most severe cases, stupor and coma supervened; coma vigil was noted.

Marked irregularity of the pulse rate occurred throughout the course of the disease. The volume and pressure likewise varied. Graphing of the pulse-temperature curve showed, on careful analysis, a marked irregularity and lack of correspondence between the pulse-rate and fever.

The respiratory rate was variable; graphing demonstrated no constant pulse-respiration ratio. Cheyne Stokes' and Biots' breathing were not common, but were noted occasionally. Hyperpyrexia, increasing coma and markedly laboured respiration frequently preceded death.

In hyper-acute cases, shock, with a low blood pressure, was present. In the ordinary cases, a normal or increased daily blood pressure was generally noted. The four-hourly blood pressure records sometimes revealed remarkable fluctuations. In the acute stages, extensive graphing failed to demonstrate any constant relationship between the amount of fluid obtainable daily by lumbar puncture and the blood pressure, but in the sub-acute stages, with dry puncture and internal hydrocephalus, the blood pressure persistently rose in at least three cases investigated.

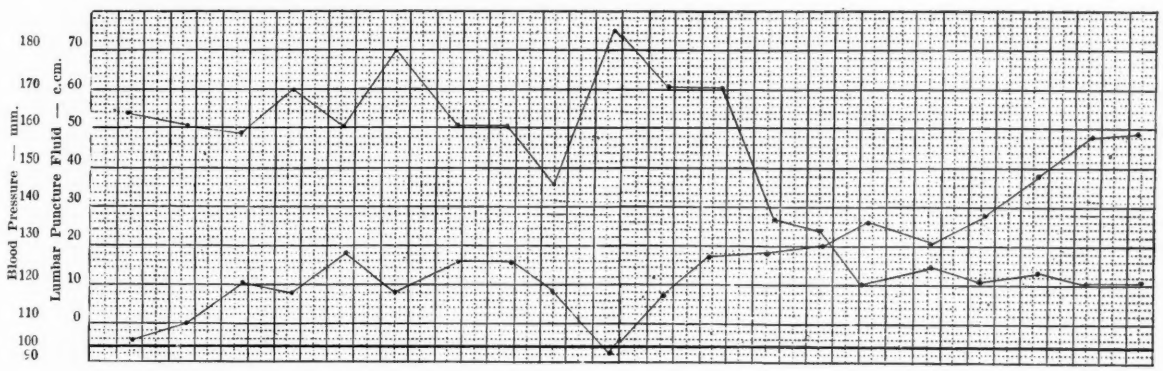
The temperature was mostly of a remittent and intermittent type. Severe cases were occasionally afebrile, though a high temperature was generally present in the acute cases. Hyperpyrexia was of grave prognostic significance (107.6° F. noted in one case). The superadded factor of hydrocephalus on sepsis would seem to explain the irregular graphing results of the blood pressure, respiratory and pulse readings, in comparison with their constancy in other diseases, like typhoid fever and pneumonia.

There was a petechial rash in 20% of the cases, usually on the extremities and in some cases it was actually purpuric. Erythema was common, especially about elbows and knees, varying from a slight flush to an intense redness. This was sometimes associated with petechiæ, and not infrequently with a "goose-skin" appearance around the hips and elbows. Herpes occurred in 35%, and was well marked on the lips. It was not noted elsewhere.

Conjunctivitis occurred in 20%, varying from a mere injection of the vessels to pus formation, and, in two cases, to corneal ulceration.

The tongue was moist, and covered with white fur in the early stage. It was dry brown and fissured in the later stages. The fur was often very thick and of a dirty yellowish-brown tint, and was sometimes associated with similar deposits on the fauces and palate. In many cases there was a dry brown centre, with white fur laterally.

In early stages a pharyngitis was manifested by reddening and injection of the vessels of soft palate, fauces and pharynx, with slight swelling of the tonsils and increased mucus secretion. Later, the palate and fauces were red, rough and raw-looking. The posterior pharyngeal wall was granular, and was covered with thick, yellowish-brown muco-pus.



Curve Showing Irregularity in Relationship Between B.P. and General Hydrocephalus, and Rise of B.P. with Establishment of Internal Hydrocephalus.

No characteristic signs were noted in the chest or abdomen. The clinical diagnosis of pneumonia was difficult.

Stiffness of the neck was almost universal; head retraction varied from complete absence to extreme grade. In the latter case it was associated at times with opisthotonos. Kernig's sign, Brudzenski's sign and the "neck" sign were usually more or less marked, but were not so common as stiff neck. In comatose patients they were sometimes absent. Kernig's sign usually persisted well into convalescence. *Tache cérébrale* was marked in most cases. The superficial abdominal reflexes were almost always absent; the plantar reflexes were indefinite; the deep reflexes were frequently increased, but sometimes absent. Retention of urine was frequent; at times there was incontinence, which might have been from overflow. Incontinence of fæces was common in the severer cases.

Optic neuritis was reported in two cases, while a third patient had pallor of the discs. The pupils were of medium to large size, and reacted to light, except in the very serious cases and in cases of

severe internal hydrocelphalus, in which they were dilated and fixed. They were rarely unequal. Nystagmus occurred in chronic cases with much dilatation of fourth ventricle. Strabismus was common, frequently being very transient. Ptosis was noted. Deafness occurred in three cases, and facial paralysis in four, while transient and permanent hemiplegia was noticed. The frequency of transient paralysis was a marked feature. Peripheral neuritis was very common and of variable duration. Hyperæsthesia was common, especially of the neck.

There was definite leucocytosis, the number of polymorpho-nuclear cells averaged about 20,000.

The urine was usually acid (occasionally very alkaline), and contained more or less albumin in 85% of the cases. Slight hæmaturia occurred in 20% of cases, even in those in which no urotropine had been used, while pus was frequently present in microscopical quantities. Casts and epithelial cells were occasionally found, and bacteria, both bacilli and diplococci, were common. (In many cases repeated catheterization was necessary.)

The cerebro-spinal fluid was clear in the early septicæmic stage, and varied later from milky to turbid, or to thick pus, becoming clear again in convalescence. Its reaction was invariably faintly alkaline, and Henderson's sensitized indicator (supplied to us by the courtesy of Professor Osborne) never yielded an acid reaction. It almost always failed to reduce Fehling's solution. Albumin was present, except in the earliest stages. It always reduced potassium permanganate, even in very early stages. Pus was present in all samples, save in those withdrawn during the very earliest stages. Intra- and extra-cellular Gram-negative diplococci were demonstrable in the majority of cases, while, on culture on ascitic agar of several drops direct from the lumbar puncture needle, typical meningococci developed.

Complications.

Complications were common in our cases. Sinusitis was rare, but cases of sphenoiditis, ethmoiditis, and antral empyema were met with. Rhinitis was not uncommon, and conjunctivitis occurred in 25% of cases. Optic neuritis, deafness, facial paresis, hemiplegia and neuritis occurred. Terminal pneumonia was not uncommonly discovered *post mortem*, while arthritis occurred in four cases, and pericarditis, parotitis, jaundice, hæmatemesis and melæna were seen. Pyelitis and cystitis were common, and one case of pyelonephritis was found at autopsy.

In two cases intracranial hæmorrhage, the one basal and the other cortical and subdural, was noted *post mortem*.

Mode of Death.

The mode of death in acute cases was usually with a rise of temperature or hyperpyrexia, dyspnœa, cyanosis, profuse sweating and coma. Directly following lumbar puncture, one patient died, with paralysis of the respiratory muscles, the pulse remaining good and the *alae nasi* working during the three hours in which artificial respiration was maintained. Death with Biots' breathing was seen. In the more chronic cases, there was gradually incoming coma, occasionally associated with a rising temperature.

Treatment.

The early cases were treated by repeated lumbar puncture, urotropine by the mouth in doses varying from 40 to 160 grains *per diem*, and citrates. The results were unsatisfactory, probably owing to the severity of the cases; none of the patients recovered. Intrathecal injection of horse-serum, after lumbar puncture, were then used, but did not appear to improve the results. Intrathecal injections of urotropine, as recommended in streptococcal meningitis, were next tried, with apparently slight improvement in some cases. About this time, we heard of a private communication of Loghan Turner, yet unpublished, which lead us to investigate the reaction of the cerebro-spinal fluid. This was found to be alkaline, never acid, and as it is only in acid media that urotropine liberates formaldehyde, to which its antiseptic properties are due, helmitol, an allied drug, which acts in alkaline media, was substituted. Further investigation showed that this drug is superior to urotropine as a cerebro-spinal antiseptic in these cases. Equal parts of helmitol and of urotropine of the same strength (10 mins. of a solution of 40 grs. to one ounce) were added to two test tubes containing 10 c.cm. of cerebro-spinal fluid from a meningitis patient and incubated at 40° C. for 12 hours; free formaldehyde was then demonstrated in the helmitol preparation, none with urotropine. A series of five ascitic agar slants were then taken, and to each was added 50 drops of cerebro-spinal fluid from a case of meningitis; one tube was used as a control, and to two other tubes three and five drops respectively of urotropine solution were added, while to the fourth and fifth tubes similar amounts of helmitol solution of equal strength (40 grs. to ʒ i.) were added. The tubes were then incubated at 40° C. for 24 hours; the control showed profuse meningococcal growths, the second and third showed definite colonies, while in the fourth and fifth there was no growth. Fermentation tests on the control and urotropine cultures demonstrated that the organism was the meningococcus of Weichselbaum.

Investigations were then made on the excretion of helmitol in the cerebro-spinal fluid, repeating the experiments of Crowe[7] on the excretion of urotropine. Helmitol was given by mouth, by rectum, and intravenously, the cerebro-spinal fluid being drawn off and tested at quarter-hourly intervals after the administration. It would seem that helmitol is excreted as well as, or better than, urotropine. In more severe cases of meningitis, larger doses are required than in convalescent patients. By the mouth grs. xv. four times daily would keep the cerebro-spinal fluid continuously under helmitol influence; by the rectum, 120 gr. caused marked reaction of fluid four hours later; intravenously, 40 to 80 grs. gave an intense reaction up to 6½ hours after adminstration. Owing to inability to procure enough helmitol, its therapeutic value *per os* and intravenously has not yet been estimated, but intrathecal in-

jections of grs. v. to xxx. in sterile saline solution after lumbar puncture have resulted in definite benefit. Seventeen cases were treated in this way. In one case spinal shock occurred, but this passed off rapidly, and in one case neuritis of the *cauda equina* followed the injection. The patient is now convalescent. In the preparation of the solution, the powdered helmitol was added to sterilized normal saline solution. Attempts to sterilize helmitol solution by heat would result in its decomposition.

Soamin was not tried, owing to the risk of optic atrophy, but neo-salvarsan was given intramuscularly in three cases without benefit.

Anti-meningococcal serum has now been used intrathecally in twelve patients, but, so far, the results have been somewhat disappointing. Only one case has responded markedly. A serum rash was noted in two cases. The patients had had antitoxin for diphtheria several years before. To two patients who were admitted in the septicæmic stage, it was given intravenously and subcutaneously, as well as intrathecally, with much benefit.

Mercury and potassium iodide, as suggested by Whitla,[8] were used in conjunction with vaccines in the more chronic cases without any appreciable benefit.

Operative treatment consisted of, in all cases, more or less frequent lumbar puncture, while in the more chronic cases attempts were made to treat the internal hydrocephalus. In performing lumbar puncture, it was frequently seen that there was sharp pain on piercing the membrane, while, towards the end of the removal of fluid there was commonly a definite frontal headache. It was found that a rise of blood pressure was as frequent as a fall. Intrathecal injections were accompanied by increase in both the rate and the depth of respiration, while the blood pressure, although it usually fell, did not always do so. Continuous drainage was tried in four cases with slight benefit.

In three of the more chronic cases with basal meningitis and internal hydrocephalus, puncture of lateral ventricle has been performed with temporary benefit. Serum was administered in two cases; both the patients died eventually. Suboccipital decompression, with drainage of the cisternæ, as advocated by Hayes,[9] has been considered, and even tapping of fourth ventricle has been suggested, but it seems that while decompression might decrease intracranial tension with benefit, the fibrinous nature of the basal pus would render successful drainage of the *cisterna magna* improbable, while operative shock would be a serious superadded factor. Owing to the patency of the ventricular system, the tension in the fourth ventricle could be relieved as easily by tapping the lateral ventricle as by the subtentorial route, while the operation itself is comparatively light.

Summary.

(1) Pathologically, the patency of the ventricular system in cases of posterior basic meningitis, and the extreme dilatation of the fourth ventricle out of proportion to the dilatation of other portions of the ventricular system, are of practical importance.

(2) Clinically, the substitution of helmitol for urotropine *per os*, intravenously and intrathecally, is advocated in cerebro-spinal meningitis; also in all other nervous conditions where urotropine is administered therapeutically with a cerebro-spinal fluid of alkaline reaction.

The description of the microscopical pathology throughout this paper is the work of Dr. J. I. Connor. Dr. F. Andrew supervized our work on nasal sinuses and investigated the nasal conditions clinically in the meningitis ward. To Drs. Mitchell and Parnell we are indebted for a record of changes in the optic discs. To Professor W. A. Osborne, Dr. Bull, Dr. W. R. Boyd and Dr. S. V. Sewell our thanks are also tendered for the advice and material help we have received from them during the investigation of the cases.

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THE SURGERY OF THE BRACHIAL PLEXUS.

Part II.

THE SURGERY OF CERVICAL RIB.

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Synopsis.

Historical.
A. Costal Variations.
  Prefixed Plexus with Seventh Cervical Rib.
  Postfixed Plexus with Aborted First Rib.
  Intermediate Types.
B. Frequency.
C. Types.
  Free Costal Process.
  Small Free Rib.
  Chondro-transverse Arch.
  Sterno-transverse Arch.
D. Anatomy.
  (*i.*) The Rib.
    Vertebral Extremity.
    Tubercle.
    Caudal Extremity.
  (*ii.*) Relations of a Cervical Rib.
E. Symptoms.
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The literature of cervical rib occurs as isolated publications scattered throughout various journals, and since it is not available to the clinician in a consecutive form, and has not been included in text-book teaching, an attempt is made to present to the reader as much material as can be found that throws light on the surgical anatomy and clinical history of this condition. Until recently, cervical ribs were considered to be of only anatomical interest. Their presence was first noted by Galen, in 1740. The first accurate description and classification was written by Gruber, in 1849; but it was not until 1905 that Thorburn called attention to the association of hand atrophy with an abnormal cervical rib.

In certain lower forms of limbless vertebrates, *e.g.*, snakes, every vertebra has ribs attached to it; but, as we ascend the scale, we find that with the development of limbs the ribs become absent from the vertebral column opposite to those segments from which the limb buds arise. In other words, the ribs are restricted to certain vertebræ, but the remains of the costal elements can still be recognized in the adult human being in the ribless areas. In man, however, it is not uncommon to find the normal number of ribs exceeded; that is, a reversive variation occurs, or a tendency to atavism. When the ribs are laid down, they are placed on a more superficial plane than the nerves, save in fishes. In these creatures, the ribs arise from the vertebral centre and not from the neural arch.

In the developing embryo, the nerves bud out from the neuroblast, and extend to a limb bud, which is co-terminous with the body segments from which it arises. But as growth proceeds, the limb bud fails to keep pace with the antero-posterior growth of the body segments from which it arose, and, consequently, the nerves are dragged together, and form plexuses.

As the nerves in the cervical region are dragged down, they prevent the mesoblastic intersegmental ribs from growing out. In other words, it may be said that they cut the ribs off short. There is thus an antagonism between the development of the brachial and cervical plexuses and the development of cervical rib is established. This antagonism is manifested by the presence of partially-formed costal elements of a normal cervical vertebra, the deep nerve groove abbreviating the seventh cervical rib, and the so-called *sulcus subclaviae* on the first rib formed by the lowest trunk of the brachial

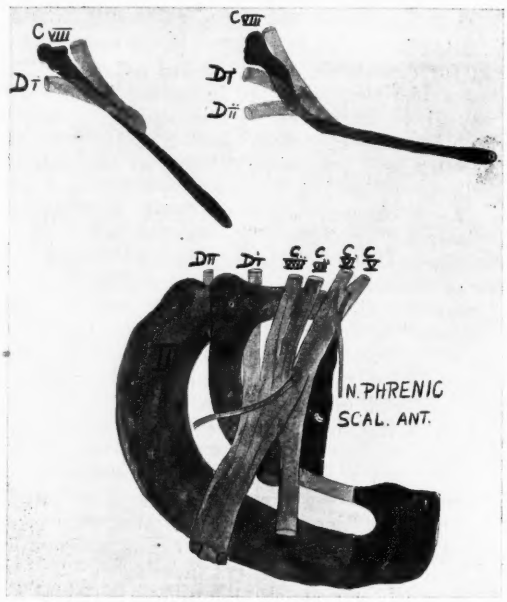

Fig. I.
(I.) Left Hand Figure above, a Normal Thoracic Rib. (II.) Right Hand Figure, showing Bending of the Axis at the Site of the *sulcus nervi brachialis*. (III.) Lower Figure, illustration an Abbreviated First Thoracic Rib, seen from above (after F. Wood Jones).

plexus. Moreover, this rib has occasionally been found to have been angulated by the nerves crossing it.

A.—Costal Variations.

A limb bud may arise more caudalwise or more cephalwise, and the brachial plexus is then said to be of the postfixed (postaxial) or the prefixed (preaxial) type. Costal variations may arise in either type. There are three main costal variations:

(1) When a prefixed plexus is associated with a seventh cervical rib, no symptoms being caused. The contribution of the first dorsal to the plexus in these cases is usually small or in abeyance (Eisler).

(2) In this variety a postfixed plexus is present, and symptoms are produced by the pressure of the first dorsal nerve on the first rib. The formation of first rib may be defected and may simulate that of a seventh cervical rib. The latter condition is rare.

(3) There is an intermediate type, in which there is a disharmony between the nerve plexuses and the rib development. A brachial neuritis may be caused by the abnormal pressure produced by a somewhat prefixed plexus on a seventh cervical rib. The degree of prefixation is not sufficient in these instances to obviate the pressure of an abnormally high costal element.

B.—Frequency.

Cervical rib is not an uncommon abnormality. It occurs in about 0.03% of normal human beings, but only in about 5% to 10% of these cases does it give rise to symptoms (Borchardt); the symptoms in about 70% are of a nervous character. It may be discovered at all ages from the intra-uterine fœtus (Rosenmüller and Pilling) to old age. Symptoms, however, are seldom produced before adolescence. Cervical ribs are bilateral in 75% of cases, but in only 30% of these instances are the symptoms bilateral. As a rule, the ribs are not equally developed on the two sides; the one is usually situated at a higher level than the other. Cases have been recorded in which two cervical ribs attached to the sixth and seventh vertebræ were present on one side (Struthers, Ehrich, Beck).

C.—Types.

Gruber classifies cervical rib under the following heads:—

(1) Smallest Type.—In this type the rib does not project beyond the transverse process proper, and resembles the articular end of the dorsal rib with head, neck, and tubercle articulating with the body and anterior aspect of the transverse process of the seventh cervical vertebra. It has been questioned whether these cases should be classed as cervical ribs. It has been suggested that they should be regarded as free costal processes belonging to the transverse process of the seventh cervical vertebra.

(2) In the second variety, a small rib reaches a varying distance beyond the transverse process and terminates in a free extremity or articulating with the osseous part of the first dorsal rib.

(3) The third form consists of a rib reaching the first costal cartilage, with which it joins either by means of a ligament or by direct contact.

(4) In the fourth variety, the rib is in all respects like a first dorsal rib, and articulates with the *manubrium sterni*. This condition is met with when a prefixed plexus is present, and it is probably of no surgical significance.

D.—Anatomy.

The rib is due to an excessive development of an ossific centre, normally represented in the fœtus by a separate centre of ossification in the anterior root of the transverse process which corresponds to the costal element. There appears to be considerable variation in the time of its appearance. The information regarding the time of fusion is very scanty; this probably occurs about the age of 17 to 18 years. This is probably the reason why cervical ribs are observed more commonly in children than in adults. The suggestion of Dr. Gilbert Scott that the osseous tissue of the cervical rib is absorbed as the child grows is less plausible. The size of the costal process varies greatly, and it is difficult to fix a limit of size beyond which it should be regarded as abnormal.

A moderately developed cervical rib resembles a normal first rib closely; it is flattened from above

Fig. II.

Diagram Illustrating the Relations of the Arteries, Nerves and Veins to Cervical Rib (Right Side). A Typical Seventh Cervical Rib (Left Side).

downwards, and the tubercle is situated at the angle.

The portion attached to the body of the vertebra is thin and narrow, and the rib increases in breadth as the distance from the spine increases. In front, it may be continuous with a taut, fibrous or ligamentous band attached to the sternum or first rib. At times, it is capped with cartilage and articulates with a buttress on the first dorsal rib, or it may end in a free extremity.

The vertebral extremity usually articulates with a facet on the body and transverse process of the seventh cervical vertebra. In this case, the vertebrasternal foramen is completed by a separately developed cervical rib (the true cervical rib of Gilbert Scott), articulating with a normal seventh cervical transverse process. Occasionally, the vertebral extremity is found to articulate with the intervertebral disc or the sixth and seventh cervical vertebræ (L. Phillips and others).

In the rarer variety the cervical rib is fused by bony ankylosis to the seventh cervical vertebra (the false, or buttress, type of rib of Gilbert Scott). It then appears in the skiagram as an enlarged transverse process, but is in reality a rudimentary rib fused with a normal transverse process.

The costal extremity usually takes the form of an osteo-fibrous arch. The rib ends abruptly, and the

transition from bone to ligament is quite abrupt and well defined. The ligamentous structure connects the tip of the rib to the sternum or more usually to the first rib behind the *sulcus subclaviae.*

A deep groove is often noticed on a cervical rib running from the inner margin forwards and outwards, and corresponding to the *sulcus subclaviae.* The anterior and outer limit of the groove coincides, as a rule, with the distal termination of the rudimentary rib.

More rarely the costal extremity forms an osteocartilaginous arch. This resembles a small normal first rib. In other instances the rib may end by its extremity articulating with a buttress on the first rib. The distal extremity of the rib is enlarged, and articulates, by means of a joint, usually a diarthrosis, with a bony projection on the first rib, which appears to be an enlarged scalene tubercle. The rib, as stated above, may also end in a free extremity.

Relations of a Cervical Rib.

The muscular attachments are usually well marked. They consist of an extra intercostal muscle usually the external, of the *scalenus medius* and *posticus,* and occasionally of the *scalenus anticus,* which may be inserted into the costal extremity. At times, the nerves and artery penetrate through the *scalenus medius* and divide it into separate fasciculi.

Brachial Plexus.

It is well known that the brachial plexus is subject to many variations. It is not regarded as abnormal unless the variation from the most common form is marked. Slight degrees of prefixation and postfixation are recognized by a greater or less contribution from the nerve trunks which mark its cephalic or caudal extremity. Eisler states that when a cervical rib is present, the plexus receives no contribution, or only a small one, from the first dorsal nerve, and we may infer, in these cases, that there is a tendency to prefixation. When a cervical rib exists and does not give rise to symptoms, the prefixation probably involves the whole nerve root. On the other hand, when a large caudal contribution from the first dorsal nerve is present, the tension between the lowest cord and the first rib increases. This is evidenced by the increasing depth of the *sulcus subclaviae,* or even by a bending downwards of the first rib. When the whole or a part of the second dorsal nerve participates in the plexus, the antagonism between the nerve and costal element may lead to a curtailment of the first rib which will then present characters like those of a cervical rib (Dukes and Owen, Keith, Hertslet Lane and Jones). In some cases the symptoms are similar to those of a cervical rib, but up to the present they have not received adequate surgical recognition. Naturally, in the majority of these cases it is the lower trunk which is implicated, and this is spoken of as "the nerve of attack in cervical rib." In certain cases the seventh cervical root is picked out, either alone or in conjunction with the lower trunk. Contrary to the usual rule, the seventh root may lie upon the rudimentary rib and groove, it and the lowest trunk may lie below the rib, as in the case described by Dupré.

It has been shown that the nerve fibres are only arranged according to their ultimate distribution, close to the point at which they are given off by the parent trunk. This is especially true of the proximal part of the brachial plexus (Bruardel and Humbert). It will therefore be seen that the sympathetic fibres are at times involved more than the spinal fibres, although the reverse is more frequently the case. Ample evidence has been brought forward by Manouélian and Cehanovic to prove that damage to the sympathetic nerves supplying blood vessels

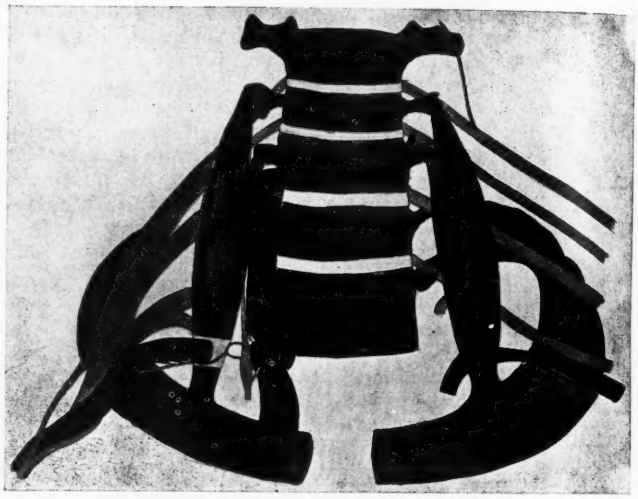

Fig. III.

(a) On the Left Side of the Diagram, showing the Nerve Supply of the Distal Part of the Subclavian Artery and the Proximal Part of the Axillary Artery. On the Right Side, illustrating Pressure of the Seventh Cervical Nerve on a Seventh Cervical Rib. (Modified from Kramer, and Dupré and Todd.)

may be followed by pathological changes in all the vessels supplied. The effect of the rib on the sympathetic appears to be at first a stimulation of the vasoconstrictor nerves, causing the pulse to become temporarily small and barely perceptible. Later, this is followed by the development of patches of arteriosclerosis in the vessel wall. These localized patches are characterized by degeneration of the elastic and muscular tissue, overgrowth of the connective tissue of the media, and marked proliferation of the media.

The phrenic nerve lies on the *scalenus anticus,* and is more or less closely associated with a cervical rib. Hunt has reported a case of spasm of the diaphragm alleged to have been due to pressure of the cervical rib; the spasm was cured by the removal of the rib.

Subclavian Artery.

In its passage outwards between the scalene muscles, there is a well-marked sigmoid curve on the subclavian artery, which allows of movement of the shoulder without damage to the vessel. This curve is more marked in children and in cases of cervical rib. It is also found that the artery rises considerably higher in the neck than normal in cases of cervical rib, and that the unusual promi-

nence of the vessel above the clavicle may draw attention to the malformation. Since the length of the chest is increased and the artery remains about average length, it is found that the artery, after it crosses the cervical rib, forms a more acute curve than normal. Halbertsma enunciated the rule that when the supernumerary rib is more than 5.1 cm. in length, the subclavian artery usually passes over the rib, but when it is shorter than 5.1 cm. the artery usually runs in front of the rib. In the latter case, the artery may be placed in a cramped position between the rib and the insertion of *scalenus anticus*. This is one of the alleged causes of the vaso-motor phenomena affecting the fingers. No instance has been recorded of the subclavian artery lying below the seventh cervical rib, but Ehrich reported a case of the artery lying between a sixth and a seventh cervical rib. In some instances, the vessel has been described as being spread out so as to cover about one inch of the surface of the rib (Murphy). It is said to have resembled an aneurysm in these cases, but dissection showed that there was very little dilatation of the vessel at that point.

This flattening, which may be noticed at the summit of the curve, is not due to the constriction of the muscles, or an aneurysm, but is a practical application of the laws of hydrodynamics. Engineers imitate it by flattening a tube for the purpose of carrying fluid over the summit of a curve (W. Todd).

Fig. IV.

The Relations of a Cervical Rib (after Luschka).

On pulling down the arm forcibly at operations, pulsation in the subclavian artery is neither diminished nor increased by detaching the *scalenus anticus* from its insertion, or by the removal of the abnormal rib (Telford).

In later stages there is a gradual progressive obliteration of the arteries of the limb, starting at the periphery, and gradually spreading up the arm, as the sympathetic twig from the *ansa subclaviae* escapes pressure. The obliteration does not usually spread further than the brachial artery. The third part of the subclavian artery is occasionally found to be dilated (Keen and Adams). Cehanovic has explained this on the assumption of a lack of tone of the vessel wall, but it is more probable that it is caused by the increased pressure produced as a result of the constriction of the brachial artery. This dilatation of the vessel is remarkable in that its situation is external to the lateral border of the *scalenus anticus* and also to the point where the artery crosses the cervical rib.

Subclavian Vein.

The vein passes in front of the *scalenus anticus*. Owing to the obliquity of the cervical rib, there is rarely any pressure on the vein. It is well protected by the insertion of the *scalenus anticus*.

Pleura.

The pleura extends higher in the neck in case of cervical rib than under normal conditions. It lies in close association with the periosteum of a cervical rib, and is often intimately connected to it. It may therefore be injured during the operation for removal of the rib.

E.—Symptoms.

The symptoms of cervical rib are more frequently evident in women than in men. They usually make their appearance in adult life, and are rare before 20 years of age. They are often noted in advanced age, and, as stated above, they are, as a rule, unilateral, in spite of the fact that cervical ribs are often bilateral. The symptoms are usually right-sided.

The symptoms of cervical rib are exclusively symptoms of pressure and of displacement of certain structures.

Symptoms Due to Pressure on the Nerve Trunks of the Brachial Plexus.

Pressure may be exercised on the motor, sensory or sympathetic fibres of the nerve trunks of the brachial plexus. It is also possible that the trophic fibres may be involved.

Motor Fibres.

The first to be impaired are the finer movements of the hand, *e.g.*, those necessary for holding a needle in sewing, writing, picking up pins, piano-playing, etc. Later, the extensors of the wrist and fingers become weak.

Wasting of the individual muscles developes soon after loss of power becomes manifest. The intrinsic muscles of the hand are most frequently affected, but in more severe cases, the flexors of the fingers and wrists may be involved, and the hand may assume a *main-en-griffe* position. Of the intrinsic muscles, those of the thenar eminence are, as a rule, most markedly wasted. The wasting commences in this situation. The *abductor pollicis* and *opponent*

pollicis appear to be most extensively affected, and the *flexor brevis pollicis, adductor pollicis,* and the *interossei* are rarely affected until late in the affection, and then only to a minor degree. The explanation of this is that although the peripheral nerve supply of the *abductor pollicis, opponens pollicis,* and *flexor brevis pollicis* is derived from the same source, *viz.*, the median nerve, the root supply of these muscles is different. The *abductor* and *opponens pollicis* receive the root supply from the seventh cervical nerve, and the *flexor brevis pollicis* from the eighth cervical (prefixed plexus). On the other hand, it may be due to a selective nerve action, comparable to that of the external popliteal portion of the sciatic nerve, etc. (Ferrier, *Brain,* 1881-2, IV., p. 217-303).

Reaction of Degeneration.—The electrical testing of the wasted muscles usually reveals the reaction of degeneration in its typical form, but where the muscular wasting is excessive, the electrical response to galvanism, as well as faradism, may not be obtained.

Spasm of Muscles.—At times a spasm of the third and fourth fingers in flexion, an adduction of the thumb, or an abduction of the little finger is noted. This may be due to a condition similar to that giving rise to bent arm or causalgia.

Types of Muscular Involvement.

The muscular involvement may affect the thenar eminence at an early stage. In 79% of the cases the *abductor* and *opponens pollicis* are involved. The adductors are not affected till later (median type), In 20% of the cases the hypothenar eminence may be involved. This is known as the ulnar type.

The musculo-spiral type is rare. It is supposed to be caused by pressure of the seventh cervical nerve on an accessory rib, or implication of a small bundle of fibres running from the eighth cervical nerve to the posterior cord. A fourth early form of muscular involvement is called the interossei type. This form is rare.

The flexors of the fingers and wrist become involved at a later stage.

Sensory Fibres.

Sensory symptoms occur long before the motor. The subjective symptoms consist of pain and paræsthesia. Pain occurs in about 75% of the cases, and presents several distinguishing features. It is of shooting or darting character, and is usually unilateral. It is usually experienced only in the forearm, but in rare instances it may be felt in the neck or shoulder. It is more commonly referred to the ulnar border of the forearm than to the radial side of the arm or fingers. The pain is intensified by cold weather, over-exertion, as in swimming, washing floors, wringing clothes, piano-playing, painting, sewing, etc. Occupation is, therefore, a marked predisposing cause in the production of symptoms in cervical rib. It is also intensified by certain positions, *e.g.*, hanging the arm down, and to avoid this, patients may be in the habit of keeping the arm resting on a chair, using an arm-chair, or of sleeping on the affected side with the arm raised above the head, in order to raise the shoulder girdle. The pain always radiates in a downward direction. In other words, it is a centrifugal pain, in contradistinction to trigeminal neuralgia, where the pain is usually centripetal.

Paræsthesia occurs in the hands or fingers in 20% of the cases. It takes the form of a tingling and numbness or a sensation of pins and needles. The paræsthesia may reveal the existence of pressure on the brachial plexus months or even years before the paralysis develops. It is usually unilateral, and is felt along the radial and ulnar borders of the hand, and often in the finger tips.

The objective symptoms consist of a dulling or loss of epicritic and protopathic sensation. This is present in about 70% of the cases. It is extremely variable; in some cases no alteration in cutaneous sensibility can be detected; in others there is a loss to all forms of sensation. The distribution is never exactly that of the radial or ulnar nerve, nor does it correspond exactly to that of a root supply. Only part of the root area is involved as a rule. This part corresponds to the first dorsal and possibly the sixth cervical area.

The eighth cervical and the first dorsal type is accompanied by a defect of epicritic and protopathic sensibility on the inner side of the forearm, and also of the little finger. This is present in 65% of the cases.

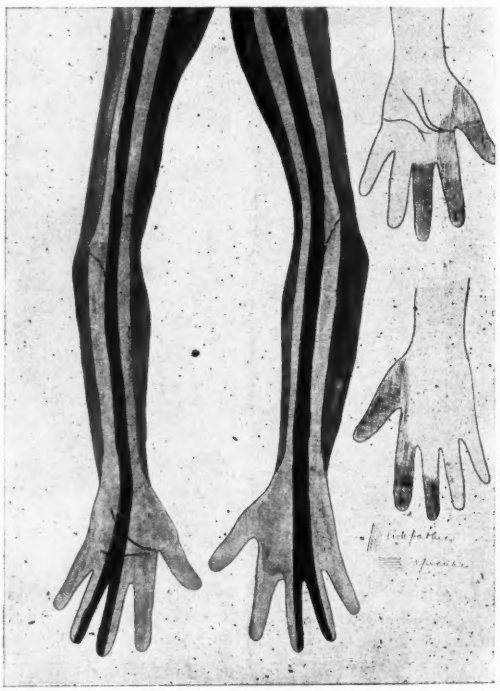

Fig. V.
Diagram of the Sensory Root Distribution of the Brachial Plexus (after Thorburn). The hands represent one of the forms of Anæsthesia caused by Cervical Rib.

In the sixth cervical area type an epicritic loss is only present in the outer two fingers and thumb,

This root, however, is not affected by a cervical rib, and the only explanation seems to be a post-fixation of the seventh root; this root, and not the true sixth cervical, is involved. This form of sensory disturbance is met with in 35% of the cases.

Trophic ulcers and sores similar to the trophic lesions seen in syringomyelia may occur.

Vascular or Sympathetic Fibres.

Vascular symptoms commence in the fingers and spread up the arm as the arteries gradually become obliterated. The pulse may be small on the affected side, or may even be absent, but in early cases it may become equal to that of the unaffected side, when the arm is raised. Conversely, on taking a deep breath, the pulse may disappear. Delay in the rise of the wave, as compared with healthy side, is also noticed, and this is attributed by Cehanovic to a loss of tone of the vessel wall.

A condition in which the symptoms are indistinguishable from those of Raynaud's disease is met with. The symptoms may be persistent, or they may come on after exertion, as in the series of cases described by Sir William Osler. In these cases the condition resembled intermittent claudication.

Implication of the sympathetic fibres is evidenced by pallor, cyanosis and localized gangrene. In pallor or local syncope, the hand becomes blanched, wrinkled, and cold. The affected part become intensely congested in the condition of cyanosis, and the extremity becomes cold. This condition is spoken of as local asphyxia. Local gangrene may affect the tips of the fingers.

When cold water is applied, the patient has the sensation that it is many degrees colder on the affected side than on the unaffected side. Œdema is exceedingly rare.

Tumour Formation in the Supraclavicular Triangle.

This has been noted in 20% of the cases. A palpable or visible swelling may be formed by the rib in the supraclavicular fossa. The swelling is hard, more or less rounded, usually fixed, and may often be traced back to the cervical vertebræ. It is often tender to the touch, and may also cause the artery, which is displaced upwards, to be prominent. Visible pulsation, accompanied by a thrill and a *bruit* is present. The *bruit* is not usually conducted down the arm. Aneurysm of the subclavian artery in association with a cervical rib is extremely rare. The small number of pulsating tumours recorded would indicate that aneurysm is not common. It is doubtful whether aneurysm existed in those cases in which this diagnosis has been recorded. It should never be assumed that there is an aneurysm unless a dissection has been carried out and the artery exposed. In some cases the vessel has been described as being spread out so as to cover about one inch of rib surface, and resembling an aneurysm. Dissection, however, has shown that there was very little dilatation of the vessel.

Associated Changes.

The most important of the associated changes is scoliosis. In 2% of persons affected with scoliosis a cervical rib is present, and 5% of those who have cervical ribs are scoliotics. Scoliosis in association with cervical rib was first pointed out by Garré, who demonstrated that the convexity of the primary curve was usually towards the cervical rib or the larger cervical rib, and that the scapula was occasionally displaced upwards and outwards on the affected side.

Syringomyelia has been described by Oppenheimer in association with cervical rib. Borchardt, Marbury, Schönebeck and others have also noted this coincidence.

F.—**Clinical Types of Cervical Rib.**

In one of the types recognized by the clinical characters of the symptoms, rheumatic or neuralgic pain in the arm, referred to a deep situation in the arm, in the bone, or in the joints, or pains of a shooting nature extending down the ulnar side of the arm is predominant. In a second form, the chief symptom is weakness of the arm and wasting of the hand muscles. Pseudo-acroparæsthesia, signalized by numbness and tingling of the hand and forearm, occurs in a third type, while the most striking sign in the fourth form is a prominence situated in the neck, often associated with pulsation.

(To be continued.)

Reviews.

MORBID ANATOMY.

The study of morbid anatomy depends on a knowledge of pathological changes and a mastery of technique. As in every branch of science, the value of the work of the post-mortem room is lost, unless the person carrying it out has mastered the details, and unless he is thorough in his application of knowledge to practice. Dr. Beattie's book on ost-mortem methods[1] should prove useful to the general practitioner and to the morbid anatomist, because it teaches them how to carry this work out properly.

The subject matter is carefully arranged with a view to practical utility. First there is a description of the tools and equipment necessary for post-mortem examinations. This is followed by an account of the various external appearances of the dead body. A full description is given of the way in which the body should be opened and in which the different organs should be examined. A chapter is devoted to post-mortem examinations for medico-legal purposes. This contains instructions to be followed in cases of suspected poisoning. In addition, the technique to be employed in the examination of laboratory animals form a separate chapter. The author gives a full description of histological methods and of examinations required in special cases, and in an appendix he deals with the preparation of museum specimens, of culture media and of stains for microscopical work.

The thorough investigation and appraising of post-mortem findings is undoubtedly a matter for experts, but the general practitioner is often called upon to ascertain the cause of death, especially in the country. This book should be a great help to him.

THE DYSENTERIES.

Though the diseases forming the subject of a book by Professor Phillips, entitled Amœbiasis and the Dysenteries[2] are fortunately not prevalent at present in any part of Australia, sporadic cases and even small outbreaks occur from time to time. It would seem from a perusal of the records of the early history of Australia that dysentery was at one time a common complaint. Moreover, the return of our soldiers from Egypt and Turkey now and at the end of the war may introduce into our midst some of

[1] Post-Mortem Methods, by J. Martin Beattie, M.A., M.D., 1915. Cambridge: The University Press; Demi 8vo., pp. 230.

[2] Amœbiasis and the Dysenteries, by Llewellyn Powell Phillips, M.A., M.D., B.C. (Cantab.), F.R.C.P. (Lond.), F.R.C.S. (Eng.), Professor of Medicine of the Egyptian Government School of Medicine, Cairo; 1915. London: H. K. Lewis. Demy 8vo., pp. 147. Price, 6s. 6d.

the undesirable "aliens" responsible for these diseases. It is therefore necessary for medical practitioners to learn from the literature dealing with amœbiasis and dysentery in order that, should they be called upon to deal with cases of this nature, they may be prepared to recognize the various types, and to treat them with success. As in all infective diseases, the prevention of a spread must depend on early diagnosis and prompt prophylaxis and treatment.

Professor Phillips deals with the affections of the intestines, liver, bladder, mouth and other organs caused by parasitic amœbæ, and follows this up with a clear description of dysenteric conditions due to ciliates (*Balantidium*), flagellates (*Lamblia*), and *Bitharzia*. These descriptions are accurate and quite excellent. In the next place, he gives a full account of the bacillary dysenteries, and describes the various bacteria causing them, their toxins, antitoxins, agglutinins, etc. He discusses the clinical course of the affections, the complications met with, the diagnosis and pathology. The importance of an accurate bacteriological diagnosis of every case of dysentery is emphasized. The detection of amœbæ in the stools does not necessarily justify the diagnosis of dysentery, since the harmless *Entamœba coli* (should this not be *Endamœba*?) may be mistaken for the pathogenic *Entamœba histolytica*. The detection of the latter must be regarded as an indication for treatment with emetin. In the case of bacillary dysentery, it is of importance to determine by biochemical reactions the type of organism responsible, more especially in regard to the means to be adopted to check the spread of the disease. The book is admirably planned, and can be recommended to practitioners as a sound and reliable work.

The Menace of the House Fly.

Mr. Fitzsimmons has written a little book of a popular nature with the object of educating the public in the matter of the dangers to health associated with the house fly.[3] While this object is wholly excellent, attention should be called to the fact that the medical part of the publication is unreliable, and that many misstatements are made. In several instances the author indulges in exaggerations which only serve to damage his case. This defect is serious, since when an author is discovered to be unreliable in an important particular, not only will the ordinary reader be loth to accept other statements in the same publication, but the cause itself will suffer. Many persons are inclined to pin their faith to the utterances of so-called authorities, and to hold the view that if one statement on a particular subject is proved to be erroneous, the whole teaching must be unsound. The author should correct his statements in the interests of the subject to which he has applied himself.

The following are examples of some of the sins committed:—"Diseases which afflict humanity would be reduced by at least two-thirds if the microbe-carrying house fly were extirminated." "Flies have been captured at random, and with the aid of a powerful microscope, the disease microbes have been examined on them and even counted." "The hundreds of house flies which you harbour in your dwelling may, each of them, have a million germs of one or more serious diseases on their bodies." It can scarcely be considered a "well established" fact that the stable fly "is the principal disseminator of the organism of infantile paralysis."

The entomological aspect of the fly problem is well and interestingly dealt with, and attention may be directed to the measures recommended for controlling the pest.

Naval and Military.

According to the *Age* of October 11, 1915, Colonel Fetherston, Acting Director-General of Medical Services, is about to leave for the front. After inspecting the trenches in Gallipoli, he proposes to journey to Malta, and may proceed to England before returning to Australia.

[3] The House Fly: A Slayer of Men, by F. W. Fitzsimmons, F.Z.S., F.R.M.S., etc., Director of the Port Elizabeth Museum; 1915. London: Longman, Green and Co. Demy 8vo., pp. 87, with illustrations. Price 1s.

The work of establishing the State War Councils in New South Wales and Queensland is progressing slowly, but definite steps have been taken, and, within a short time, it is anticipated that the preliminary stages will have been completed. In New South Wales, the majority of the members have been appointed, and some meetings have been held. Offices have been secured at the old Education Department Building, Sydney. Mr. D. J. Gilbert has been appointed Secretary to the Council.

It is reported that the Council of the New South Wales Branch of the British Medical Association is being consulted as to the plan of work and the best means of achieving what is to be done. The Branch Council has been invited to appoint a State Medical War Committee, to consist of three or more members of the Branch. This Committee will act as a Sub-Committee of the State War Council. The President of the State Medical War Committee will, if thought desirable, become an *ex officio* member of the State War Council. In addition to the accommodation for the Council, rooms will be placed at the disposal of the State Medical War Committee for the examination of soldiers, and clerical assistance will be procured. It has been suggested that Dr. Murphy, the Superintendent of Technical Education, and Mr. Hedges, the Superintendent of the Institute for the Deaf and Dumb and the Blind, will be asked to act as expert advisers to the Council.

In Brisbane, the State War Council is getting to work. A capable Secretary has been appointed, accommodation has been secured, and the members show their intention of dealing energetically with the problems in hand.

The following announcement has appeared in the Commonwealth *Gazette* No. 125, under date of October 14, 1915:

AUSTRALIAN IMPERIAL FORCE.

Termination of Appointment.

His Excellency the Governor-General, acting with the advice of the Federal Executive Council, has been pleased to approve of the appointment of Lieutenant-Colonel W. R. Smith in the Australian Imperial Force being terminated. Dated 15th October, 1915.

G. F. PEARCE,
Minister of State for Defence.

The following has appeared in the Commonwealth *Gazette* under date of October 13, 1915:—

Army Medical Corps.

To be Major—

Honorary Major W. Chisholm, A.A.M.C. Reserve.

A.A.M.C.—

Lieutenant-Colonel W. R. Smith, from appointment of Principal Medical Officer, 4th Military District, is transferred to the Unattached List.

It has been determined to suspend recruiting in the Newcastle district for a time, owing to presence of variola.

The Deputy Director-General of Medical Services is making arrangements for the institution in each State of a Base Depôt of Medical Stores. The depôt will be placed under the charge of a major of the A.A.M.C., who will have the services of a quartermaster, orderlies, etc. The supplies will be available for the training camps, the military hospitals, and the transports.

THE TRENTHAM CAMP.

The Director of Medical Services for New Zealand has submitted to the Minister for Defence a report on the condition of the Trentham Camp. The camp is stated to be free from serious disease at present, and to be sufficient for its present needs. There is no overcrowding, the number of recruits and soldiers to the acre being 105. The Director is quite satisfied with the huts in use, and compares them favourably with those in use in other camps within the British Empire. He has recommended that hot and cold water systems should be installed without loss of time, and also that the excreta should be dealt with by incineration.

The Medical Journal of Australia.

SATURDAY, OCTOBER 23, 1915.

Medical Registration.

It is usually admitted that *ad hoc* legislation is undesirable, save under exceptional circumstances. We can conceive conditions in which special Acts of Paliament to meet an individual case would be beneficial and wise. For example, if the German Reichstag were to pass a bill into law with the object of depriving the Kaiser of his crown and the part of his body on which the crown rests, and if this bill were to mete out to some of his military advisers an analogous treatment, it would be held that the *ad hoc* legislation would be justified and advantageous. The New South Wales Parliament has been asked to pass some *ad hoc* legislation to which no exception can be taken. This is to enable certain graduates in medicine to be registered, in spite of the fact that they have not spent the prescribed period at the University before proceeding to their final examinations in medicine. The reason for this innovation is quite sound. In order that practitioners may be available for military service, the University of Sydney has shortened the course by six months without letting the men off any part of their studies, and without altering the examinations.

The Bill passed smoothly through its three readings in the Legislative Assembly, and was sent on to the Council on October 13, 1915. Its passage through the Council would not have called for comment, had it not been for an amendment moved by Sir Thomas Hughes, which seems to have been regarded as harmless. It was accepted, and the Bill passed through the remaining stages. In the Assembly, objection was taken to this amendment, and the debate was adjourned on the 14th.

The amendment was as follows:—

> Provided that no person shall be deemed to be a legally qualified medical practitioner or entitled to be registered as such, under the provisions of Sub-section I. (B) of this Section, by virtue of a diploma, degree or license, entitling him to practice medicine in the country to which a university, college or other body therein mentioned belongs, unless it be made to appear to the Board that the laws or regulations in that behalf in force in such country, the right to practice medicine therein is granted to persons who are registered in this State as legally qualified medical practitioners under this Act by virtue of their being so registered and without further examination.

It is understood that the *Medical Practitioners Amendment Bill* has been proposed as a legislative measure to meet a special requirement and to remain effective during the currency of the war. If the amendment is carried, it will be necessary to ascertain from the exact terms whether the provision would be retrospective or not. At present, it is unnecessary to enter into a discussion in regard to the merits and demerits of reciprocity as applied to medical registration. The amendment of the Medical Acts in New South Wales is being considered by the Branch and the Federal Committee of the British Medical Association in Australia is watching for an opportunity to deal with the whole question in a uniform manner for the Commonwealth. The clause, as proposed, advocates a form of reciprocity which is undesirable and even dangerous. We assume that it was Sir Thomas Hughes' intention to make it retrospective. This would mean that many practitioners who have been registered in virtue of some foreign degree would be debarred from practice, notwithstanding the fact that they enjoy all the other privileges of citizenship. These men are efficient practitioners and honoured members of the medical profession. There are ways and means of dealing with persons of enemy nationality. No special legislation is needed for this purpose. But to sweep away all practitioners who have obtained degrees or diplomas at some non-Australian University in a country where reciprocity has not been arranged would affect allied nations and neutral nations, as well as enemy nations.

Apart from the question of the retrospective application of the provision, grave objection should be taken to the proposal. Since it does not meet an urgent necessity, it cannot be argued that any

reason exists for this form of temporary legislation. The main principle of the Bill is justified by the condition of war, but the addition is an attempt to apply a general principle for a special period. Very careful consideration should be given to this proposal of reciprocity as applied to a young country like Australia. A measure containing this provision should be debated in both Houses fully, and the opinion of the medical profession should be sought before any definite step is taken. Grave objection must be taken to the attempt to introduce into a non-contentious measure an extraneous amendment, which is foreign to the subject of the Bill and unnecessary in the present circumstances.

———o———

THE PAY OF MILITIA OFFICERS.

Some four weeks ago a number of complaints were received by the Department of Defence regarding the unnecessary expenditure incurred in the maintenance of the Australian Imperial Forces. The Department apparently have taken this complaint to heart, and a decision has been arrived at to reduce the pay of militia officers not inconsiderably. The proposed scale of reduced pay has been announced in the public press. Colonels receive payment at the rate of £821 per annum, and it is proposed to reduce this to £675. Lieutenant-Colonels receive £684 a year, which is to be reduced to £575. Majors are paid £547, and will in future only get £475. The pay of Captains will be reduced from £410 to £375, and that of Lieutenants from £273 to £250. It is assumed that medical officers are included in the scope of this change.

It must be pointed out that there are practically no permanent medical officers in the Australian Forces. The reduction would, therefore, affect every medical practitioner serving the Empire within the Commonwealth. In view of the hardship which would be inflicted, representations are being made by the Councils of various Branches of the British Medical Association in Australia to the military authorities, with the object of obtaining exemption from the rule for medical officers. It is to the advantage of the service generally that each man undertaking home or foreign duty shall be reasonably satisfied with the conditions of his service. The ordinary militia officer does not necessarily suffer pecuniary loss by the fact of being away from his business, and it is obviously unjust to the permanent officers that they receive more for their services than the latter. In the case of the medical officers, no injustice exists, because there are no permanent officers.

In the second place, it has been pointed out on numerous occasions that medical men suffer material pecuniary loss by relinquishing their practices for a time. The relations between doctor and patient are essentially personal relations, and while a satisfactory *locum tenens* may hold the greater part of a practice for a month or two, it is extremely rare for a substitute to satisfy all the patients of an absent practitioner for long periods of time. The average practice suffers at the hands of an average *locum tenens*. Moreover, there is a very great difficulty at present in securing the services of a *locum tenens*. Many of the men who have joined the A.A.M.C. have failed to obtain a substitute; others have been compelled to pay their substitutes as much as ten guineas a week; while others again have found it advisable to enter into an arrangement with colleagues in the neighbourhood to temporize with their patients during their absence. All this means substantial loss of income, and yet the expenses of the practice are not reduced.

We claim that the pay of a captain of £410 per annum is less than the loss sustained by the average man leaving his practice to the tender care of strangers. On the other side of the balance sheet there is a substantial gain to the Empire. The State should not be parsimonious in its dealings with men, who are prepared to make large sacrifices, and the suggestion to reduce a salary, which cannot be regarded as a large one, is unworthy of the great Commonwealth to which we belong. The private receives a salary which, in many cases, is larger than the wage he earns during peace time. Why should medical men be under a disability in this respect? We therefore claim that a good case has been made out for exemption of medical officers from the application of the rule.

THE CAUSE OF DR. HOPE'S RETIREMENT.

A short time ago the announcement was made that Dr. James W. Hope, the Principal Medical Officer and Commissioner of Public Health of Western Australia, had tendered his resignation to the Government, and that this resignation has been accepted. In response to a question asked in the House, the Premier referred the questioner to Dr. Hope for the reason. The papers dealing with the events which led Dr. Hope to ask to be relieved of his offices were laid on the table of the Legislative Assembly on October 5, 1915. We trust that the publicity given to these events will stimulate the public sense of equity. The voluminous papers contain an account of a story which can be recited in a few words. It appears that on December 23, 1914, Dr. Hope called the Minister's attention to the decision of the Appeal Board, according to which the emoluments of his office should be raised from £850 to £1,200 *per annum*, on the ground that his position was that of the premier medical officer of the public service, and quarters, light, fuel, etc., were not provided. In 1911, a classification of the emoluments was issued, and Dr. Hope had took exception to the fact that other officers were receiving in money and kind more than he was. The Inspector-General of the Insane received £852, in addition to free quarters, farm produce and other perquisites, which were equivalent to at least £250 *per annum*. Since he was the head of the service, he claimed that his remuneration should be larger than that of any other officer. He therefore appealed against the classification of the Public Service Commissioners. It will be noted that 2½ years had elapsed between the appeal and the notification of the Appeal Board, upholding his claim. No reply was received for several months to the letter sent to the Minister. Dr. Hope thereupon appealed again for fairness, and a recognition of the importance of his office, and made the one concession, namely, that owing to the financial stringency, he would be satisfied with the assurances of the Government that the monetary consideration would be made available to him within a year. The Public Service Commissioner retorted that the Appeal Board had arrived at its conclusion on an incorrect basis. He went on to state that the position of the Inspector-General of the Insane was not comparable to that of the Principal Medical Officer, inasmuch as quarters, fuel and other perquisites could not be regarded as salary. But, in the next sentence, he admitted that in computing pensions the reverse held good. He made an attempt to save himself from a charge of inconsistency by making the extraordinary statement that a concession did not prove the rule. Dr. Hope considered the position anomalous. The Commissioner had made a bad calculation. This has been corrected by a superior authority, and when he claimed for redress in accordance to the findings of the higher authority the decision of the Public Service Commissioner was relied on. He made a final attempt to seek justice. He sought an interview with the Minister, which was refused, but when representations were made of the desirability of granting a high official a hearing, the Minister acceded to his request. It seems as if the Minister had been almost persuaded of the justice of Dr. Hope's claims, since the next step was a reference to the Cabinet. While the individual may have hesitated, the body of Ministers hardened their hearts and refused to listen to logic. Dr. Hope took the only course consistent with dignity; he threw up his position.

No one except a politician would entertain the argument put forward that free house, fuel, farm produce, etc., are not salary in kind. A man who upholds this contention has no right to speak of logic. The matter is therefore one of principle. The Principal Medical Officer is entitled to the full recognition of the importance of his office. Since this is the highest in the medical branch of the public service, the salary should also be highest. Dr. Hope would have neglected a duty to his office had he not protested. We hold, further, that the Government of Western Australia is culpable for having delayed its decision from the middle of 1911 till 1915.

THE OVER-SEAS CLUB TOBACCO FUND.

We have received the following letter from the Honorary Secretary and Organizer of the Over-Seas Club, in response to our first contribution to the Tobacco Fund.

Dear Sir,—

Please accept my warmest thanks for the fine contribution to our Tobacco Fund obtained through your journal.

Would you be good enough to convey to the subscribers, through your journal, that their subscriptions are sincerely appreciated? The money will not only bring real happiness to the men, who will receive parcels according to your instructions, but will give them practical proof of how keenly their welfare is being thought of by the folks at home.

Here in London the admiration for the courage and initiative of the splendid Australian boys is beyond words. We pray that the great sacrifice they are making may bring enduring good.

As you request, I am now enclosing another subscription list.

Amongst the many activities of the Club, perhaps you have heard of the success of our Overseas Aircraft Fund? Over £38,000 has already been collected, and the money is now being expended in the purchase of aeroplanes, but the wastage is so huge in the present conditions of warfare that many more contributions will be vitally needed.

To sit at this desk and deal with the thousands of letters, collecting cards and remittances received from every corner of our far-flung Empire, makes one more and more impressed with its splendid unity and eagerness to serve the common purpose. It is the aim of the Club to spread the knowledge of Empire and cement the fabric of comradeship from sea to sea.

Yours very truly,

E. WRENCH,
Hon. Sec. and Organizer.

The Over-Seas Club,
General Buildings, Aldwych,
London, W.C.,
2nd Sept., 1915.

The total of the second contribution at present stands at £24 17s. 6d. Please send us a few more shillings, in order that we may remit £50 this time.

Abstracts from Current Medical Literature.

THERAPEUTICS.

(146) Use of Chenopodium.

V. G. Heiser has collected data concerning the use of oil of chenopodium as a remedy against hook-worm and other intestinal parasites in the hospitals of the Orient (*Journ. Amer. Med. Association*, August, 1915). Owing to the disturbance of trade through the war, thymol has become scarce and expensive. Some physicians have employed oil of chenopodium in its place, but objection is urged to its use on the ground that it causes nephritis and severe paralysis of the central nervous system. Information has therefore been collected from Malaya, where large numbers of cases of hook-worm are treated with the oil of chenopodium, with results better than those obtained with thymol. The oil used in the East is obtained from England, America and Germany. By inquiry at the large hospitals, it was found that over 100,000 patients had been given the oil, and that only one case of nephritis had been seen. In Sumatra, the oil of chenopodium is used as a remedy against round-worms, tape-worms and whip-worms, as well as against hook-worm. It is usually administered in 15 minims doses, divided into three parts on sugar and one lump of sugar taken at hour intervals. The vermifuge is usually followed with a full dose of castor oil mixed with a small amount of chloroform.

(147) Toxicity of Oil of Chenopodium.

W. Salant and E. K. Nelson have carried out a large series of experiments to test the toxicity of oil of chenopodium (*Amer. Journ. of Physiology*, March, 1915). The aim of these experiments has been to determine accurately the resistance of various animals to oil of chenopodium, to ascaridole, which is obtained from it, and to a third product derived from the oil but differing from ascaridole in the position of the two oxygen groups. Administered to dogs and cats, chenopodium and its derivatives leads to symptoms of depression of the higher nervous centres. These symptoms are followed by convulsions. Rabbits are affected in the same way, though, not infrequently, the convulsions are absent. Guinea-pigs are affected in a similar way to rabbits. The resistance of dogs, rabbits and guinea-pigs to chenopodium is approximately the same, but cats are distinctly more susceptible to the drug. Ascaridole is about 30% more toxic than chenopodium. The product with the atoms differently arranged has only one-half the toxicity of the oil. The symptoms appear in the same time when the drug is administered subcutaneously as when given by the mouth. The toxicity of the drug is increased by starvation and is diminished by feeding oils and by allowing a diet rich in carbohydrates. The acute symptoms produced by chenopodium are suppressed by the use of fixed oils. This may be due to its solubility in oils. The distribution of the oil of chenopodium in the intestine and stomach is thereby altered and its dose greatly diminished. Evidence has been obtained that the detoxication through the feeding with a diet rich in carbohydrates is due to conjugation of the toxic bodies with glycuronic acid. This glycuronic acid may be derived from glycogen or glucerides. Distinct signs of cumulation in the effects of the drugs have been obtained. It is suggested that the administration of castor oil after the oil of chenopodium accounts for the absence of toxic symptoms in man after the administration of large doses.

(148) Action of Chenopodium on the Circulation and Respiration.

W. Salant and A. E. Livingstone have studied the effects of intravenous injections of oil of chenopodium on the circulation and respiration of dogs, cats and rabbits (*Amer. Journ. of Physiology*, July, 1915). An intravenous injection of 0.02 c.cm. per kilogram of body-weight leads to a fall of blood-pressure. This effect is more marked in dogs than in cats or rabbits. A second injection produces a greater effect on the blood-pressure. Further injections, however, do not affect the blood-pressure at all. The fall of blood-pressure is of cardiac origin, and leads to a diminution in the excretion of urine. The frequency of the heart is chiefly affected. Respiratory depression, characterized by diminished pulmonary ventilation, due to slowing of the rate of breathing and lessened amplitude in the muscular movements, is well marked. Rabbits are much less affected in their respiration than dogs or cats. This is probably due to the higher tension of carbonic action in the blood. No hæmolysis has been noted in the blood after the intravenous injections. Methæmoglobin has not been observed either in the blood serum or in the urine. The maximal amount that can be administered intravenously without toxic symptoms is 0.3 c.cm. per kilogram of body weight.

(149) Influence of Bathing in Salt Water.

H. I. and H. A. Mattill describe some observations on the metabolic influence of bathing in the Great Salt Lake, Utah (*Amer. Journ. of Physiology*, July, 1915). The experiments were carried out on two subjects who lived for periods of seventeen days on uniform diets, composed of crackers, butter, milk, and water. The amount of nitrogen consumed each day was about 13 gm., and the fuel value of the diet was 3,000 calories. Each experiment was divided into five periods—a preliminary period of five days, a bathing period of four days, three days without bathing, four days of bathing and a final period of two days. The composition of the water of the Great Lake showed 19.2% of total solids, of which 93% was chlorides calculated as sodium chloride. After each bath, which lasted for thirty minutes, the body was rinsed in fresh water and then wiped with a towel. The temperatures of the water varied around 22° C., and the temperatures of the air varied from 17° to 31° C. The excretion of total nitrogen was increased 5% to 7% during the bathing periods. The excretion of the chlorides was increased over 25% during the bathing periods. This suggests the possibility of absorption through the skin and subsequent secretion of the excess of chlorides. A fall of temperature occurred during the baths, the diminution amounting to 2° F. The temperatures were taken in the rectum.

(150) Quinine After Operations.

E. Bonnot and A. H. Cleveland report the result of the rectal administration of 10 grains of quinine hydrochloride, dissolved in two ounces of water as a routine practice after operations (*Journ. Amer. Med. Association*, August, 1915). They have used this treatment in 600 cases comprising all cases with ether anæsthesia. They claim that backache is eliminated, that nausea is lessened and that thirst is retarded. The treatment is most efficacious in children who are given a dose proportionately less, according to their age. The use of the quinine after chloroform anæsthesia had to be given up, owing to the cyanosis and the cardiac trouble that resulted.

(151) Salvarsanized Serum in Syphilitic Nervous Disease.

C. E. Riggs advocates the use of salvarsanized serum in the treatment of syphilitic disease of the nervous system (*Journ. Amer. Med. Association*, September, 1915). He has used the method for over 200 injections, following the procedure of Swift and Ellis. The intraspinal method is considered to be quite safe in the hands of competent men. In cerebro-spinal syphilis and in tabes the results have been most encouraging. In 75% of the tabetic cases the Wassermann reaction has become negative in the cerebro-spinal fluid. The clinical symptoms improved in all but two out of 25 cases. He reports a case of acute mania much benefited by two injections. He is of opinion that the results are so satisfactory as to warrant the belief that the cure of these conditions may be expected in the near future.

UROLOGY.

(152) Spontaneous Rupture of the Kidney.

Spontaneous rupture of the kidney due to a progressive pathological condition is very rare. H. Windsor Wade is of opinion that not more than 30 instances have been recorded (*Journ. Med. Research*, July, 1915). He adds the details of a case in which the rupture occurred in acute toxic

nephritis, and was associated with secondary perirenal hæmorrhage. Primary or essential hæmorrhage caused by renal arterio-sclerosis, interstitial nephritis, acute parenchymatous nephritis, and *periarteritis nodosa* has been described. Secondary hæmorrhage may be due to renal neoplasms, tuberculosis, acute focal infections, abscess, hydronephrosis, infarction, or hæmophilia. The case described is said to be the second recorded, in which a bilateral rupture due to an acute parenchymatous nephritis occurred. The rupture may take place in the absence of sufficient perirenal hæmorrhage to cause symptoms. In other cases definite symptoms may be produced by the perirenal hæmorrhage. When the rupture is due solely to the rapid swelling of the parenchyma, and to œdema of the interstitial tissue, the cortical capillaries may be compressed sufficiently to prevent extensive hæmorrhage. In the case described by the author the rupture was probably due to the combined circumstances of antisyphilitic treatment given to a patient with active syphilis, chronic malaria, and acute parenchymatous nephritis. On microscopical examination many of the parenchyma cells were found to present an unusually extensive accumulation of colloid globules. Wade suggests that these colloid globules were degeneration products.

(153) Renal Pain and Renal Hæmorrhage.

Cuthbert Wallace and Leonard S. Dudgeon (*Brit. Journ. of Surg.*, July, 1915) have investigated the conditions obtaining in cases of unilateral hæmorrhage and unilateral pain of renal origin. They discuss four cases. In two there was hæmaturia, the urine was acid, but did not contain casts, although blood and albumin issued from one kidney. The indigo-carmine test revealed normal renal function. Portions of the kidney were removed at operation for histological examination. In one case there were small scattered areas of fibrosis in the cortex, and a few glomeruli were fibrous. Some of the cells of the convoluted tubules were swollen, distended and granular. In the second case the renal capsule was much thickened, and there was fibrosis of the glomeruli, with swelling of the cells of the convoluted tubules. In two cases unilateral nephralgia was complained of. There was no albuminuria. The urine was free from casts, but contained in one case some oxalate crystals and a few pus cells. The function of the kidney was not disturbed. Histological examination of a portion of the kidney removed at operation, and fixed at once, revealed some small round-celled infiltration in one case, associated with degeneration of the cells of the convoluted tubules and exudate in the duct tubules. A streptococcus was isolated in pure culture. In the second case there was scattered areas of fibrosis, with atrophied glomeruli and tubules. Vacuolation of cells was found in one case of hæmaturia, and one of nephralgia. The authors discuss the ætiology and pathology of the conditions in order to ascertain an explanation for the vacuolation. It has been found experimentally that vacuolation of renal cells can be produced in guinea pigs by the injection of iso-nephrolysin. They suggest that in their two cases this change was produced by a toxin in the blood, which they suppose caused the nephritis.

(154) Contemporary French Urology.

Tuffier, in an article dealing with contemporary French surgery, published in the *British Journal of Surgery*, July, 1915, devotes a short chapter to the subject of urology. He has studied cases of suprarenal virility, a curious affection characterized by the rapid growth of the child with virile development, or by a masculine appearance in the female. This condition is due to a hypertrophy or benign tumour of the suprarenal body.

Legueu and Morel have shown that cancer of the prostate can be differentiated from adenoma by blood examination. In the latter there is a suburethral eosinophile infiltration, while the former is associated with a polynuclear leucocytosis with hypoeosiniphilia.

Heitz-Boyer has obtained rapid cicatrization of tubercular vesical ulceration by means of high frequency currents. Hypogastric gangliostomy has yielded good results in some rebellious cases of cystalgia following cystitis. The transvesical route for the operation of vesico-vaginal fistulæ has been employed, when the fistula cannot be brought down on account of its high situation, or because the vagina is sclerosed and narrowed. In the last place, he points out that in wounds of the bladder laparotomy should be performed when the lesion is intra-peritoneal, but not when the peritoneal is intact.

(155) Perinephritic Abscess.

Edward P. Richardson (*Surg. Gynec. and Obstet.*, July, 1915), published a general review of a series of 59 cases of perinephritic or paranephritic abscess operated on at the Massachusett's Hospital, from 1899 to 1913. In the first case the suppuration may originate in the perirenal fat primarily. A second group occurs in which the condition is secondary to suppuration or infection of the kidney, intestinal tract, spine, ribs, or pleura. In the primary cases the infection may be carried to the perirenal tissue through the lymphatics, through the blood stream by metastatic infection, or from overlooked renal lesions. Trauma may be a contributing factor producing hæmorrhage in the fat capsule. The importance of ureteral lymphatics in ascending affections of the kidneys and perinephric tissues has been pointed out. In 5 of the 59 cases a metastatic hæmatogenous infection spread by direct extension from structures or organs outside the renal fascia. In 20 cases the metastatic infections was dependant on antecedent or predominant diseases of the kidney or urinary tract. In 8 of these cases the pus was sterile, while *bacillus coli*, *staphylococcus aureus*, and a bacillus with a streptococcus were isolated in three cases. Among these cases were instances of renal tuberculosis, pyelonephritis, and pyonephrosis. The remaining 34 cases are classed as primary. In 21 of these a bacteriological examination of the pus was carried out. The organisms found included *staphylococcus aureus*, other forms of staphylococci, streptococcus, and *bacillus coli*. In two cases a metastatic source of infection from a furunculosis, and in two others from erysipelas, could not be excluded. In the fifth case there was a streptococcal infection of the shoulder joint; in the sixth the condition followed influenza, and in the seventh it followed bronchitis. Trauma was quite common in the series. In one case it was quite definite. The urine was apparently normal in 12 of the 34 cases, and the blood culture was negative in 6. There was a leucocytosis in 33. Richardson points out that staphylococcus is the most common organism producing primary perinephritic abscess.

(156) Non-Gonorrhœal Intra-Urethral Lesions.

G. Greenberg (*Med. Times*, New York, August, 1915) points out that the most common disease affecting the urethra other than gonorrhœa is syphilis. The initial lesion may be placed at the meatus, or in the navicular fossa. The symptoms are very mild. There may be very little discharge, and pain is not necessarily severe. The diagnosis is made on the presence of *spirochaetae pallida*, induration of the lesion, inguinal adenitis and lymphangitis at the base of the penis. No local treatment is required. Chancroids may also occur within the urethra. This, however, is very rare. The best form of treatment is cauterization with silver nitrate, and irrigation with 0.1% copper sulphate solution. A 1% iodoform emulsion is injected once a day. The author is of opinion that tuberculosis of the urethra is not uncommon, but that it is not usually recognized. He has seen one case of tuberculosis of the prostatic urethra in the terminal stages of tuberculosis of the kidney, bladder, prostate, vesicles, and epididymis. Polypi may be found in all parts of the urethra. There may be no symptoms, or there may be bifurcation of the stream on micturition. When situated in the posterior urethra, the signs of posterior urethritis will be present. Cysts, either retention cysts or of the developmental type, are also met with. The symptoms are those of obstruction. In the last place the author deals with false passages and diverticula. The latter may be acquired or congenital. The acquired form is due to an impervious stricture. Unless it is treated infection will supervene, and periurethral abscesses with urinary fistulœ may form.

Scientific Societies.

THE ROYAL SOCIETY OF NEW SOUTH WALES.

The adjourned meeting of the Section of Public Health and Kindred Sciences of the Royal Society of New South Wales, was held at the Royal Society's House, 5 Elizabeth Street, Sydney, on October 12, 1915.

The President of the Royal Society, Dr. R. Greig Smith, took the chair.

It was decided to hold the next meeting in May, 1916. It was proposed and carried that a Recommendations Committee be formed to consider the publication of papers read before the section. The following members were elected to the Committee:—Sir Thomas Anderson Stuart, Messrs. A. Peake, L. Meggitt, Drs. G. Griffiths, and C. S. Willis.

At the meeting of the Section held on September 14, 1915, Mr. T. H. Houghton, M.Inst., C.E., dealt with the question of the disposal of wastes and the sanitary services of camps. He said that this subject in its military aspect necessarily claimed attention after the matter of the water supply had been dealt with. The War Office and other manuals contained full details of the sanitation of ordinary camps and bivouacs, but something more than the elementary precautions included in these descriptions was required for permanent camps. This was especially true when the camp extended over a large area, when it had a large population, and when it was situated near a town, and had many visitors. The chief source of trouble was the disposal of human excreta. Save when the municipal authorities of an adjoining town undertook the service, or when there was an independent water-borne system of sewerage, with its own treatment works or an ocean outfall, the excreta should be destroyed by fire in a furnace or desiccated by steam in a properly constructed steam desiccator. The former method had not found favour in Australia. Desiccation had been adopted with success in many places. The product had found a market as a fertilizer. The essential for the system was proper means of collection and the duplicate pan system. In regard to urine, the vessels into which it was passed should be suitably constructed and easily cleaned. The collection should be carried out in an air and water tight cart. A vacuum was created in the cart, and the contents of the urine receptacles sucked up in this way. The fluid should then be deposited over ploughed land or into trenches.

The temporary incinerators for wastes described in the manuals were satisfactory as far as they went, but the amount of fuel required to ensure complete combustion and the nuisance they caused should be avoided by the use of a more scientifically designed furnace. In conclusion, Mr. Houghton urged a close association between the engineer and the medical officer. This association would, he was convinced, benefit both the troops and the public.

Mr. Hector suggested that tutorial classes be formed among soldiers in the camps to assist in the diffusion of knowledge of hygiene among the troops.

Dr. H. C. Chapman mentioned that he had lectured at Liverpool for the Workers' Educational Association. He had found that the soldiers listened eagerly, and that they asked questions freely at the end of the lecture. As a matter of fact the questions occupied a longer time than the lecture.

Colonel E. Stokes, A.M.C., stated that it was part of the duties of medical officers to give such instruction in hygiene as was needed. The regimental surgeon should teach the men of his battalion and set them an example by his habits. Hygienic instruction had been given on board the transports and in Egypt. At the front everything went to the wall. He was of opinion that little benefit would result from hygienic instruction.

Mr. L. Meggitt thought the soldiers would be only too willing to attend instruction in the camps during the evening. The evenings were a trying time in camp, as there was little to do.

Mr. Osborne asked the Honorary Secretary to prepare a list of names of those competent and willing to give instruction in hygiene. Mr. T. Houghton moved a formal resolution to this effect, and added to the motion the words:—"And that the proper authorities be approached and asked to provide facilities for the lectures."

Mr. L. Meggitt seconded the motion, which was carried.

Mr. J. E. Bishop pointed out that many bodies had large tents at Liverpool, and that the Royal Society might obtain the use of one of them for instruction.

Colonel E. Stokes, A.M.C., gave an account of some of his experiences at the Dardanelles. In regard to water supply he said that when the troops landed they found themselves in an unknown land. Provision had been made to bring water ashore from the ships in four-gallon sealed kerosene tins. This water was used for the first few days. The troops found themselves on an alluvial formation. The highest land was only 1000 feet high. The hills were composed of clay interspersed with beds of grits. There was no rock. These hills were cut by ravines. In the main ravine, known as Sharpnel Gully, a creek trickled. The engineers sank shallow wells along the edges of the creek, and on the lines of the other ravines. These wells served to supply a portion of the water required. Each man received half a gallon of water per day. He had had a tumbler of water with which to shave, to clean his teeth, to take a bath, and to wash his clothes. These shallow wells soon gave out. Deep wells were then sunk, and one had struck a good supply of water from a grit bed at a depth of 30 feet. This well looked like a "gusher" which would yield 20,000 gallons per day, but it did not maintain its early promise. Other deep wells were sunk, and some amount of water obtained. The rest of the water was brought ashore in punts. This water was said to come from Malta and Alexandria. The water in the shallow wells was liable to contamination. It was treated in barrels and water carts with chlorinated lime in the proportion of 5 parts to 1,000,000 of water. The water then gave a strong odour of chlorine. It was allowed to stand for 15 minutes, when the excess of chlorine was neutralized with hyposulphite of soda. The water from the deep wells, which were not liable to surface pollution, was not treated before use. Since the recent advance the troops had reached more level country, and had arrived in the neighbourhood of larger streams. Plenty of water had been obtained by sinking shallow wells along the banks of these streams. There had never been any fear of the Turkish soldiers wilfully contaminating the water. The Turk was a religious man, who held water sacred. In regard to food supply the troops received the ration laid down by the Army Council. This included the famous army biscuit, which made excellent ammunition. Even men with sound teeth experienced difficulty in eating it. It made the gums sore, wounded them, and was probably accountable for much oral sepsis. He had often asked himself whether it was not possible to supply the same amount of nutrition in a more palatable form. Later bread was supplied. It was well baked, and palatable. The ration included 1¼ lbs. bread per diem. The meat distributed was their old friend "bully beef," of which they received 12 oz. each day. At times they had frozen meat for a treat. The men got 4 ozs. of bacon, 4 ozs. of jam, 3 ozs. of cheese, 3 ozs. of sugar, pepper, salt, and 2 ozs. of tobacco, or its equivalent in cigarettes. The Australians did not like their cheese, and could not eat all the meat. They received instead some more jam. The ration was improved later by adding some condensed milk and rice in lieu of other articles. In addition they received one half-pound of vegetables, usually potatoes or onions. When no vegetables were available, they received one half ounce of lime-juice. This was very acceptable. The men clamoured for it, and it was made a daily ration independent of the supply of vegetables. There was much diarrhœa, but it was not due, in his opinion, to the diet. It did not appear for one month after the landing at Gallipoli. In most cases it was simple diarrhœa. In many cases it was colitic, and resembled dysentery. There was much blood and mucus in the stools. These cases were sent away at once. Some of them were subjected to bacteriological examination in Egypt. It was reported that they were not cases of true dysentery.

In regard to the sanitary arrangements, after the first few hours the usual shallow trenches were used for the

latrines. Later a deeper trench was used. After some weeks it was not easy to find new ground for these trenches, so limited was the space occupied by the troops. They were therefore compelled to dig trenches two feet wide and as deep as possible, 6 to 8 feet. Seats were placed across these, and a back to the seats to prevent men toppling over. In the fighting trenches large pits were dug on laterals off the communication trenches. Every effort was made to persuade the soldiers to cover the excreta with earth. The men, however, would not do this efficiently. It was necessary to form a sanitary squad to go round from latrine to latrine, to cover the excrement. In places pans were tried, but these were not satisfactory. In consequence of these conditions flies became at first numerous and later a serious pest. The chief fly caught was the domestic house-fly. When the nuisance became serious, an endeavour was made to find the breeding places of the hosts of insects. Dr. Tebbutt located them in the shallow pits, which were used at first for latrines. The deeper parts of these were one moving mass of maggots. Covering them with a few inches of earth had not been sufficient to prevent the exit of flies. The only chemical available for their destruction was a coal tar disinfectant, sent out in large tins labelled *liquor carbonis saponatus*. This particular variety appeared to be a crude phenol, emulsified with an alkali. It took a 10 per cent. solution of this to kill maggots. As water was scarce the disinfectant was diluted with urine. He had asked for some chlorinated lime and some crude mineral oil to kill these flies, but his requisition was refused. Later he heard that a thousand gallons of crude oil was on its way, but it did not arrive during his presence at the front. With the development of flies much sickness occurred. The men began to lose condition, and there was great loss of efficiency through sickness. At this time it was not possible to see any formed motions in the latrines, and the majority of the men lost about two stone in weight. The destruction of refuse was not a serious problem, except in regard to tins. There was no refuse of food. It was all eaten. He found that tins burnt well. The burning of tins solved the question of refuse destruction. The droppings from the mules were also burnt. An Indian officer in charge of a field ambulance designed an incinerator, and burnt all the refuse and the excreta from his unit of 100 men.

In regard to sickness it was curious that, in the Indian field ambulance, there were a number of cases of scurvy. This was due to the diet, which did not suit the coloured soldiers. There had only been three cases of enteric fever in Egypt. The freedom from this disease during six months was a convincing proof of the efficiency of preventive inoculation. Cholera had always occurred among the Turkish soldiers, so that the problem of anti-cholera inoculation was considered in Egypt. It was decided not to inoculate the troops in Egypt, but two months after they had disembarked in Gallipoli the orders came to inoculate the troops against cholera. This was carried out at the front in fourteen days. It was a difficult matter, as the men were given twelve hours' leave from the trenches for the inoculation. They had used two injections, the first of a half cubic centimetre of bacterial emulsion, and the other of twice that amount. The whole was done very successfully. There was much less reaction than in the case of inoculation against enteric fever.

Dr. Willis asked why such a large excess of chlorine was used in treating the water.

Dr. Guy Griffiths sought information as to whether the flies bred in dead bodies.

Dr. Chapman asked whether the diet was sufficient, as its heat value did not seem to be over 4000 calories.

Colonel Stokes, in reply, said that the large amount of chlorinated lime was used to ensure an excess of chlorine. The hyposulphite of soda was added as a routine practice. He had noted a large blow-fly that bred in dead bodies, but it caused no trouble, as it devoted all its attention to dead Turks. The clay prevented any soakage, in consequence of which the trenches for excrement became very wet. What the soldiers most needed was change of food. They wanted variety in their diet. The most useful presents to send friends were pickles and sauces to help down the meat, puddings, jams, sweets and cocoa mixed with dried milk.

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Public Health.

THE HEALTH OF NEW SOUTH WALES.

The following notifications have been received by the Department of Public Health, New South Wales, during the fortnight ending October 11, 1915:—

	Enteric Fever. Cs.	Dths.	Scarlet Fever. Cs.	Dths.	Diphtheria. Cs.	Dths.	Infantile Paralysis. Cs.	Dths.	Malaria. Cs.	Dths.
Metropolitan Combined Districts	19	—	114	5	68	5	1	—	3	—
Hunter River Combined Districts	1	—	9	—	7	—	—	—	—	—
Remainder of State	11	—	112	3	83	1	—	1	—	—
Total	31	—	235	8	158	6	1	1	3	—

INFECTIVE DISEASES IN QUEENSLAND.

The following notifications have been received by the Department of Public Health Queensland, during the week ending October 9, 1815:—

Disease.	No. of Cases.
Diphtheria	28
Varicella	21
Enteric Fever	18
Pulmonary Tuberculosis	8
Cerebro-spinal Meningitis	5
Ankylostomiasis	4
Scarlatina	3
Erysipelas	1
Total	88

THE HEALTH OF VICTORIA.

The following notifications have been received by the Department of Public Health, Victoria, during the week ending October 14, 1915: —

	Metropolitan. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Diphtheria	51	10	20	0	71	10
Scarlatina	13	0	2	0	15	0
Enteric Fever	0	0	2	0	2	0
Pulmonary Tuberculosis	15	9	10	6	25	15

The following is a return of the cases of epidemic cerebro-spinal meningitis notified to the Board during the week ending October 4, 1915:—

	Metropolitan Area. Cases.	Rural Districts. Cases.	Totals. Cases.
Military	—	—	4
Civil	25	5	30

The following are the returns of the notifications received during the quarter ended September 30, 1915, by the Department of Public Health, Victoria:—

District.	Enteric Fever. Cases.	Diphtheria. Cases.	Scarlatina. Cases.	Pulmonary Tuberculosis. Cases.
Metropolitan area	13	698	94	243
Ballarat	1	4	1	14
Bendigo	2	67	0	15
Geelong	9	23	6	7
Rest of State	37	295	79	93
Whole State	53	1087	180	372

INFECTIVE DISEASES IN WESTERN AUSTRALIA.

The following notifications have been received by the Department of Public Health, Western Australia, during the week ending October 2, 1915:—

District.	Enteric Fever. Cases.	Diphtheria. Cases.	Pulmonary Tuberculosis. Cases.
Fremantle	—	1	—
Fremantle East	—	1	—
Cottesloe	—	1	1

District.	Enteric Fever. Cases.	Diphtheria. Cases.	Pulmonary Tuberculosis. Cases.
Perth	3	3	3
Maylands	—	—	1
Midland Junction	—	1	—
Victoria Park	—	—	1
Kalgoorlie	—	1	2
Boulder	—	—	1
Greenbushes	—	1	—
Lion Mill	—	—	1
Albany	—	1	—
Narrogin	—	1	—
Esperance	—	—	1
	—	—	—
Total	3	11	11

SMALL-POX AND EPIDEMIC CEREBRO-SPINAL MENINGITIS IN NEW SOUTH WALES.

The following cases of small-pox have been notified to the Department of Public Health, New South Wales, during the week ending October 17, 1915:—

Country.	Cases.
Newcastle and surrounding district	37

There have been two cases of epidemic cerebro-spinal meningitis notified among the civil population during the week ended October 17, 1915.

PLAGUE AND CHOLERA.

Bulletin No. 61, issued by the Federal Quarantine Bureau on October 13, 1915, records the frequence of plague and cholera during August and September. In the first four weeks of August there were 3,608 cases of plague in India, with 2,505 deaths. During the period from July 16 to August 26 there were 215 cases, with 208 deaths in Java. From August 1 to September 4 18 patients suffered from plague in Hong Kong, and all of them died. Twenty-one cases were reported during the same period in Ceylon. The number of deaths is not given. There were 4 cases with 3 deaths during the week ending August 19, in Mauritius, and 6 cases with 4 deaths from August 6 to September 9, in Egypt. A clean bill of health in regard to plague is issued from New Caledonia, The Philippine Islands, South Africa, and the Straits Settlements.

It is officially reported that cholera is still prevalent at Batavia, in the Dutch East Indies, and that it has broken out in Tiflis and other towns in the Caucasus in Russia. There has been one fatal case on August 6,, 1915, in the Philippine Islands, and another fatal case in August in the Straits Settlements.

No vessels had been placed in quarantine.

THE HEALTH OF THE CITY OF MELBOURNE.

The Health Committee of the City Council, Melbourne, have submitted their report for the year ending December 31, 1915. The report shows that no serious epidemic disease occurred during the year. The number of patients admitted to the Queen's Memorial Infectious Diseases Hospital at Fairfield was 284, of whom 247 suffered from diphtheria and 20 from scarlatina. Twelve cases of diphtheria were fatal. The City Council contributed £350 towards the cost of two motor ambulances for use by the hospital. During the year 286 patients were admitted to the Heatherton Home for Consumptives at Cheltenham. Eighty-nine of these patients were from the city of Melbourne. The number of cases of pulmonary tuberculosis notified was 158, and the number of deaths was 106, as against 93 in the previous year. The Council's staff inspected 2086 premises for rats, and destroyed 17,376 rats during the year. Much attention has been given to the inspection of dwelling-houses. Six hundred and fifty-six houses were condemned as unfit for human occupation. Of these 339 were renovated sufficiently to allow of their re-occupation, 89 were vacated, and 139 were demolished. The Council's officers inspected 340 premises proposed to be utilized for factories: 275 were approved, and 47 rejected for various reasons. Special attention was devoted to the abatement of the smoke nuisance. Proceedings were instituted against the proprietors of nine establishments when warnings had been of no avail. Fines were inflicted in four cases.

Thirty-eight applications were received for the registration of premises as private hospitals. Two were refused on account of the unsuitability of the premises.

During the year 323 samples of food were submitted to analysis. The total number of articles of food found to be adulterated was 16, of which 13 were samples of milk. It is gratifying to note that this is the third consecutive year in which no chemical preservative has been detected in any of the samples of milk examined. Attention has been paid to the conditions of restaurants, eating houses and premises used for the manufacture, preparation for sale and sale of ice cream and non-alcoholic drinks. Nine premises were found to be unsatisfactory. No diseased animal was detected among those allowed to pasture in the parks and other places within the city. The tuberculin test is applied to all cattle, and only such cattle as pass the test are permitted to graze on the parks.

Extensive alterations and improvements have been effected in a number of establishments carrying on noxious trades. The staff has been increased by the appointment of two additional sanitary inspectors and one additional female sanitary inspector.

The report of the Medical Officer of Health, Dr. T. W. Sinclair, is appended. It contains much additional useful information. The estimated population of the city of Melbourne was 105,200, which shows an increase of 1000 during the year. The density of the population is 14.2 persons per acre. The number of births was 2387, corresponding to an annual birth-rate of 22.7 per 1000 of population. The number of deaths of children under one year was 202, yielding an infantile mortality rate of 86 per 1000 births. Although this rate is somewhat lower than usual, a study of the infantile mortality rates since 1900 gives no warrant for the belief that there has been any marked diminution since that date. The number of deaths amounted to 1381, an increase of 47, which was almost entirely due to the inclusion of the deaths occurring in the Hospitals of the Insane of residents of the city. These figures have been included for the first time this year. The death-rate was 13.8 per 1000 of population. On examination of the causes of death it is found that the principal zymotic diseases occasioned 47 deaths. Of these 15 were due to diphtheria and 13 to measles. The increased number of deaths due to measles should be considered in connexion with the increased number of deaths due to pneumonia (130 as against 109), and to bronchitis (36 as against 29 in 1913)). Diarrhœa and enteritis were also responsible for more deaths than usual. Tuberculosis of the lung occasioned 106 deaths, diseases of the heart and blood vessels 192. There were 56 deaths from accident, and 19 cases of suicide. Of the 272 deaths of children under one year 91 were due to prematurity, 74 to developmental diseases, 62 to diarrhœa and enteritis, 13 to pneumonia, and 2 to measles. Some meteorological data are supplied, which show that the year was unusually dry, while the mean annual temperature was raised about 2° F. There was an increase in the number of cases of scarlatina during the year, but there were no deaths from this disease. Diphtheria still continues to cause a large amount of illness. Two hundred and ninety-seven cases occurred during the year, of which number 247 occurred singly. A leaflet setting out the mode of infection and precautions to be adopted has been circulated where this disease has appeared. There were 36 cases of enteric fever reported during the year. This is the least number of cases reported for 16 years. One hundred and fifty-eight cases of pulmonary tuberculosis were notified during the year. There were 109 deaths in the same period, equivalent to a death-rate of 1 per 1000 of the population. A pamphlet has been prepared and circulated in the homes of the patients. The cause of infection was investigated in 219 patients. In 136 cases it was reported that the disease occurred during residence in the city. The number of the patients who were born in the State of Victoria was 140. No definite information as to general modes of infection was obtained. In only three cases was infection traced to other members of the family. One case of leprosy was detected. The patient had suffered from the disease for three years, and had resided in the city for 15 months prior to his removal to quarantine. One case of small-pox, contracted in Sydney, resided in a hotel for nine days, though fortunately without spreading the infection.

THE HEALTH OF WESTERN AUSTRALIA.

Dr. J. W. Hope's annual reports on the work undertaken in the Health, Medical, Factories, and Early Closing Departments are always full of interest and philosophical treatment of great social problems. His report for the year 1914 is exceptionally interesting. There are some expressions of opinion to which exception might be taken; his deductions may be open to criticism from time to time, but the general tenor of the report and the greater part of the material are excellent and worthy of careful perusal.

Financial.

The chapter dealing with the expenditure of the combined departments contains some almost astounding information. It is recorded that the amount spent during the year 1914 was £108,729, as compared with £111,941 in 1913. This sum was made up of sums expended in regard to hospitals, sums required for health administration and money spent on factories and the administration of the Early Closing Act, 1912. The cost per head of the population for these items was:—

	s.	d.
Hospitals	4	11¼
Health	0	7.2
Factories—Early Closing	0	0.79

Dr. Hope remarks on the fact that the cure of disease costs more than its prevention. The maintenance of hospitals in sparsely populated centres costs the Government an unjustifiable amount of money. We are told that at the Government Hospital at Wyndham the cost per patient per diem was £8 1s. 5d., while at the assisted hospital at Peak Hill it was £18 15s. But it must be pointed out that there were only 7 patients treated at the former, and only 2 at the latter hospital, so that an explanation for this apparent extravagance is given. Western Australia is much overprovided with hospitals. Dr. Hope remarks that once a hospital has been established it is difficult to close it should the districts become less thickly populated. It would seem to us that this difficulty should be overcome, for there is no justification for keeping an institution open when the patients are so few that the cost is far in excess of the fees charged by any private practitioner. There was one hospital to every 225 persons in the State. The condition is nearly as bad in Queensland, whereas in New South Wales, in 1912, one hospital corresponded to each 331 persons, and in Victoria to each 372 persons. Dr. Hope pleads for the creation of special reserves of land for the future support of the demands for the maintenance of hospitals. While we agree that there is no wiser policy for hospitals than to invest money bequeathed in landed property, it would, in our opinion, be preferable if steps were taken to stimulate the public to contribute to the support of hospitals, and thus to relieve the Government of the burden, at the same time increasing the efficiency of these institutions.

The maintenance cost per patient per diem at the Perth General Hospital was 5s. 2d.; at the Children's Hospital, Perth, it was 6s. 6d.; and at the General Hospital, Fremantle, it was 6s. 3¾d. The number of beds in these hospitals and in the hospital at Subiaco is 534. The maintenance at the Government hospitals worked out at 7s. 9¾d., and the total number of beds in these institutions is 566. There are 338 beds in the assisted hospitals, and the maintenance worked out at £1 1s. 9d.

The number of local health authorities established under the Public Health Act was 124, 31 of which were municipal councils, 52 road boards, and 40 local boards of health. These local health authorities only cost the State the sum of £215 during the whole year. The heaviest item of expenditure in the bill of the Health Department was that of salaries, amounting to £8828. Other details in regard to the expenditure and revenue of the local authorities are given.

Vital Statistics.

The vital statistics of the States are dealt with regularly in another column of *The Medical Journal of Australia*. It is therefore unnecessary to enter into many details in this place. Dr. Hope gives a chart containing the curves of the general death-rate and of the infantile death-rate for the 20 years from 1895 to 1914. The former shows a steady reduction from 18 per 1000 of population to about 9.5. Similarly, the downward grade of the infantile mortality has been almost regular, and an interpolated straight line would start at close on 175 per 1000 births, and end in 1914 at 70. With the exception of Tasmania and Queensland, Western Australia showed the highest natural increase in the world. The death-rate was lower only in New Zealand. Dr. Hope states that the fate of the Empire rests in the hands of the present generation, and calls attention to the duty of marrying prudently, and producing, if possible, a family of at least four children. He presses his point home. He advocates early marriage, and bewails the fact that while women are competing with men in various professions and other walks of life, they are losing the prospect of marriage. Teachers, typists and clerks are, he says, being trained, while mothers, wives and cooks are required.

In dealing with the infantile mortality, he points out that approximately 1% of the deaths of infants under 1 year of age were traceable to syphilis, and over 29% were due to diarrhœa and enteritis.

In dealing with the incidence and mortality from infective diseases, Dr. Hope neglects to discuss rheumatism and other processes which lead to affections of the cardio-vascular apparatus. The significance of these diseases from the public health point of view is very great, and it is time that some form of prophylaxis were introduced to stem the great ravages inflicted on the community by diseases affecting the heart and blood vessels. We note with astonishment that he includes cancer among the infective diseases. It may be so, but at best this is a surmise, and we venture to question the correctness of the view. Tuberculosis caused 246 deaths during the year. Of these 229 were instances of pulmonary disease. There were 353 cases of chronic pulmonary tuberculosis notified. The number of notifications received since 1909 has varied considerably year by year. The highest number was in 1912. The death-rate from this form of disease has varied from 61 per 100,000 of population in 1910 to 73 in 1912. In 1914 it was 71. The total tuberculosis death-rate varied between 0.7 per 1000 and 1.01. In 1914 it was 0.75. He deplores that no specific cure by drug, vaccine or serum has yet been discovered. Some of the disciples of the tuberculin treatment may quarrel with this view.

Enteric fever has been treated 721 times in the State in 1914. There were 57 deaths, which is equivalent to a case mortality of 7.9%. In 1910 the case mortality was 5.4%, in 1911 it was 13.6%, in 1912 it was 10%, and in 1913 it was 7.8%. He delivers a powerful dissertation in favour of antityphoid immunization. We endorse every word he writes on this subject, and with him we regret the fact that so few have taken advantage of the offer of free supplies of vaccine or of gratuitous inoculation. The whole of the community in Australia should be inoculated against enteric fever, in order that the disease might be stamped out.

Diphtheria was notified 785 times, and proved fatal on 37 occasions. The case mortality was therefore 4.7%. A more skilled use of antitoxin should effect a marked diminution in the mortality of this disease; full or moderate doses injected within the first 36 hours of the onset have reduced the mortality to almost vanishing point. The injections should be carried out even before the bacteriological diagnosis has confirmed the clinical suspicion. Scarlatina was notified only 45 times, and only one child died of the disease. Morbilli is not notifiable, and consequently the number of cases occurring is unknown. There were 6 deaths. Similarly the incidence and case mortality of pertussis cannot be given. No less than 20 deaths were attributed to this cause.

Dr. Hope records the fact that 19 cases of malaria were reported from Broome, and 26 of dengue fever. There were 109 cases of beri-beri among the men engaged in the pearling industry. Of these 14 proved fatal, *i.e.*, a case mortality of 12.8%. Prophylactic measures in connexion with the diet should be enforced, since beri-beri must be regarded as a preventible disease.

The number of deaths from pneumonia is given at 208. It is not stated whether these cases include the lobular variety. The mortality of this disease per 1000 of population works out at 0.64. Cancer killed 162 persons. The frequency does not appear to be varying at all widely. The mortality from this disease, or rather group of diseases, is tending to diminish in Western Australia to a slight extent.

A full account of the deaths from diver's paralysis is given. It appears that in spite of the provision of recompression chambers, the Asiatic divers are so ignorant and so obstinate that it is almost surprising that the percentage of deaths was not higher. There were 360 divers and 560 trial divers working at Broome.

Variola threatened the State by the landing of a lascar at Bunbury. This man was suffering from the disease, and gave rise to it in 7 others. One of the patients died. In one instance the disease assumed the hæmorrhagic form, and in two it was severe. The disease was controlled at the cost of £2000.

Maternity.

There were 9202 births registered during the year. The puerperal mortality is given at 45.6 per 10,000 births. The case mortality has varied between 1 in 207 in 1912, and 1 in 219 in 1914. Nineteen cases of puerperal septicæmia were notified during the year. Of the 19 patients, 11 died. Dr. Hope gives a short account of the work done at the Training School at Fremantle, which operates in conjunction with the Maternity Branch of the Women's Home and the Salvation Army Maternity Home. The need of institutional care during parturition has arisen as a result of the desire of the women to benefit by the advantages offered, and partly as a result of the provision by the Government of a number of institutions for this purpose throughout the country districts. A Maternity Hospital is to be established in Perth in response to the demands made for it by the women. Dr. Hope attempts to prove that the existing provision of maternity beds throughout the State are sufficient for all reasonable needs.

Venereal Diseases.

In view of the fact that a Bill is now being considered by the Western Australian Parliament for the control of venereal diseases, it is interesting to read Dr. Hope's arguments in favour of this form of legislation. He is especially solicitous for the provision of free laboratory diagnosis by the Wassermann test for persons who cannot afford to pay for it, and for assistance in procuring the drugs necessary for adequate treatment.

Alcoholic Beverages.

The fact is recorded that the amount spent on liquor consumed in the State is equal to £8 4s. 11d. per head of population. This sum is 5s. 6d. less than the sum spent in 1913, and the total amount saved was £89,153. Dr. Hope gives a sensible and moderate sermon in favour of temperance.

School Hygiene.

The report of the medical inspection of school children is included in Dr. Hope's volume, and is not given in the annual report of the Department of Public Instruction. During the year, 4280 children were examined. This number is barely half that of the children examined in 1913. There were some 5000 children in 57 schools, so that over 80% of the children in the schools named were inspected. The reason given for the curtailment of the work was the necessity for economy. In all 7576 defects were discovered. Of these 3306 were instances of dental caries, and 305 of *pediculi capitis*. Action was found to be necessary in 2711 children, or 63.3% of those examined. The defects included 16 cases of scabies, 11 of *impetigo contagiosa*, 9 of acne, 7 of seborrhœa, 4 of psoriasis, 3 of eczema, and only 2 of ringworm. Ophthalmic defects were discovered 1347 times. In 381 instances the defect was sufficiently severe to justify treatment or the prescription of glasses. Astigmatism was extremely common. It was detected in 881 children. Conjunctivitis was present in 55 children, partial blindness in 5, and cataract in 2. There were 22 cases of trachoma, but Dr. Hope is doubtful whether the condition was true trachoma in any of the cases.

In 929 children enlarged tonsils required treatment; in 238 there were post nasal growth ; in 605 the cervical glands were enlarged, and in 87 the submaxillary glands were enlarged. Deafness was frequent.

Spinal curvature was recorded on a number of occasions, but no definite case of tubercular caries appears to have been discovered.

There were only 17 children of weak intellect. The other defects do not call for special mention. Special endeavour has been made to induce the parents to seek proper advice in regard to the treatment of the defects discovered at the inspection, and in many cases Government aid is extended to enable them to have the children treated. A great deal of valuable work has been performed by the Odontological Society.

Nurses and Midwives.

The number of midwives on the register was 1067. Of these 37 were placed on the lists during the year. A number of women retired, and a few died. Untrained women who have been in practice for a number of years have hitherto been able to register their names. Since June, 1913, none but trained women can claim the privilege. The work is controlled by visiting nurses, who act as inspectors of midwives. In addition the visiting nurses have the duties of visiting persons suffering from tuberculosis, and of advising mothers in regard to the care of their infants. Dr. Hope is convinced of the great utility of these visiting nurses.

Miscellaneous.

The concluding chapters of the report deal with food and drugs, dairies and milk supply, public abattoirs, and offensive trades. The details in these chapters are of comparatively small importance, no unusual conditions having arisen during the year. Dr. Hope recommends legislation to restrict the advertisement of proprietary remedies and nostrums, to enable maternity homes to be registered, to provide for the State registration of nurses, and to enforce the treatment of defects discovered at the inspection of school children.

Added to the report is a number of important and well prepared appendices.

Vital Statistics.

THE HEALTH OF SYDNEY AND NEWCASTLE.

The usual monthly returns of the Government Statistician dealing with the births and deaths registered in the metropolis of Sydney and in the Newcastle district form part of the New South Wales Government *Gazette*, No. 183, of October 13, 1915.

During the month of September there were 1712 births registered in Sydney as compared with 1781 which was the average for September during the preceding five years. The birth-rate expressed as an annual rate per 1,000 of population was 27.30 as compared with 28.39. Of these births 123 were illegitimate. The illegitimate birth-rate was equivalent to an annual rate of 1.96 per 1,000 of population. This compares favourably with the average for September during the quinquennial period, which was 2.31. There were 290 births, which took place in hospitals and other public institutions. The monthly birth-rate since September, 1914, has varied between 2.61 and 2.25. The highest rate was in March, 1915, and the lowest in January. The illegitimate birth-rate has varied between 0.14 and 0.18. The highest was in May and June, and the lowest in February. There were 104 deaths of infants under one year of age. This is equivalent to an infantile mortality of 60 per 1,000 births. This rate is 3% below the average for September of the preceding five years. The highest monthly infantile death-rate during the 12 months was in December, 1914 (87), and the lowest in October, 1914 (43).

During the month 735 deaths were registered. This number is 99 more than the average for the previous five Septembers. Four persons over 90 years of age died, and in all 186 persons of 65 years or over died. The death-rate expressed as an annual death-rate works out as 11.72 per 1,000 of population. It averaged 10.62 in September of the preceding five years.

The birth-rate for the third quarter of the year was equivalent to an annual rate of 28.04. The equivalent death-rate for the quarter was 12.32.

In regard to the causes of death, the statistician gives the usual monthly classification, and adds an abbreviated statement for the quarter ending September 30, 1915. Diseases of the cardio-vascular system were responsible for 109 deaths, of which 62 were due to organic diseases of the heart, 26 to cerebral-hæmorrhage, 11 to atheroma, 3 to acute endocarditis, etc. Bright's disease was responsible for 50 deaths.

Among the causes of death of an infective nature, pneumonia heads the list with 62. Added to this there were 38 deaths from broncho-pneumonia, making a total of 100 pneumonia deaths. This number is higher than the average for the last 10 Septembers. The average works out at 51.2 Tuberculosis caused 37 deaths, including 31 from pulmonary disease. The phthisis mortality was slightly lower than the average for September. No less than 51 deaths from measles were recorded. The number of deaths from morbilli has varied considerably in the month of September during the past 10 years. In 1906 one patient died, in 1907 14 died. There were no deaths in 1908, 1909, 1911, 1913, and 1914. In 1910 there were 6 deaths, and in 1912 there were 51. Chronic bronchitis comes next on the list with 16 deaths. The number is increased to 22 by the addition of those due to acute bronchitis. This represents the average number of deaths for September. Diphtheria was responsible for 10 deaths, 9 of which affected children under 5 years of age. The average number of deaths in the month of September during the past 10 years was 6.6. There were 7 deaths from scarlet fever, and 7 from cerebro-spinal meningitis. Ten deaths were due to diarrhœa and enteritis, 6 to enteric fever, 5 to pertussis, 4 to septicæmia, 3 to syphilis, and 2 to influenza.

Twelve deaths were recorded from conditions associated with pregnancy and the puerperal condition. Four of these were due to puerperal septicæmia.

The causes of death during the third quarter include 469 from affections of the cardio-vascular system as compared with 320.2, which was the average for the corresponding quarter of the previous five years. The number of deaths from pneumonia was 274, including 170 due to lobar and 104 to lobular pneumonia. The average for the corresponding quarter for the previous five years was 184.5. In the case of measles the number of deaths was very considerably higher in the quarter of 1915 than the average. There were 132 deaths as compared with 31.6. Scarlatina also was more fatal, there being 18 deaths as compared with 2.7. There were 22 deaths from enteric fever as compared with 14, and 21 from cerebro-spinal meningitis as compared with 2.9. On the other hand, influenza only killed 10 during the quarter, while the quarter's average for the preceding five years was 16.9. Diarrhœa and enteritis killed 49 persons, as compared with 57.6. The numbers given under the heading violence remain practically constant.

The statistics for the Newcastle district are also given both for the month and for the quarter. There were 511 births during the quarter, which is equivalent to an annual birth-rate of 34.84. Twenty-seven of these were illegitimate. The deaths in the quarter number 157, which is equivalent to an annual death-rate of 10.72. There were 29 deaths from diseases of the cardio-vascular system, 13 from Bright's disease, 11 from premature birth, 8 from cancer, 8 from broncho-pneumonia, 5 from morbilli, 5 from tuberculosis, 4 from pneumonia, 4 from diarrhœa and enteritis, 2 each from enteric fever, pertussis, and septicæmia, etc.

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LIVERPOOL CAMP ENQUIRY.

(Continued from page 376.)

The Unsatisfactory State of the Medical Service.

His Honour Mr. Justice Rich, having come to the conclusion that the administration of the medical services was clumsy and uncertain, and having detailed some of the defects discovered in the course of his enquiry, recommends a number of improvements which had already been given effect to and others which may or may not prove of signal service. The recommendations can be summarized as follows:—The permanent staff of the Army Medical Corps should consist of one Major, two staff Sergeants, two Dispensers, four Sergeants, eight Corporals, and two Cooks; accommodation should be provided for the examination and treatment of patients; and civilian doctors should be utilized. In the next place, a dental corps should be formed, and a base hospital should be provided; soldiers on sick leave should be induced to make use of the homes provided by the Red Cross Society and similar organizations; and lastly, the latrine pans should be painted distinctive colours, in order that no confusion between those in use by men suffering from venereal disease and those used by other patients could occur. One other subject is included in this part of the report, but the reference is so slight that it might be overlooked. This is the specific charges made against Captain Schlink. The reference is that no officer of the permanent staff should be allowed the privilege of private practice. We will return to this subject later.

There is a mass of evidence in support of the contention that the Army Medical Camp is much understaffed in regard to medical officers. His Honour accepts the suggestions made by the Director-General of Medical Services, which we understand to be minimum demands. These minimum demands had been in force long before the report was issued. It is easy to find fault with the administration of a camp hospital when the conditions under which it has been worked would be regarded as quite insufficient in civil life. The hospital contains 150 beds, and there are the two cottages, the venereal compound, the measles compound, and the contact camp. The number of medical officers may be taken at eight as a maximum; at times the camp was worked with less, and only occasionally were there ten. An ordinary public hospital has about 18 medical men to each 100 patients. The proportion of medical officers to patients at the Army Medical Camp cannot have been more than about 3 to each 100. This is estimated on the number of patients in the various departments enumerated above. We suggest that if the men are to be kept in good condition, and those who fall sick are to be returned to the lines within the shortest time possible, there should be at least 20 medical officers to each 100 patients. The additional appointment of medical officers attached to the units should be regarded as a prophylactic precaution, and should not be in substitution of the necessary men in the Army Medical Camp.

In the next place, his Honour deals in detail with the conditions obtaining at the sick parades. It is very evident that he has never worked in a large hospital out-patient department. The opinion of those well qualified to speak on this subject tends to show that soldiers should be discouraged from presenting themselves at these parades unless they are suffering from some definite train of symptoms. Experience teaches that when the hospital out-patient department is barrack-like and devoid of all comfort, the attendance is markedly less than when it is luxuriously fitted. The sick parades appear to have been conducted in a manner which was as satisfactory as the conditions admitted. The chief defects in our opinion consisted in the deficiency of medical officers to carry out the work, and the want of a proper apartment in which a thorough clinical examination could be carried out. Neither of these defects could be described as defects of the hospital administration. Moreover, the system on which the parades depended and still depend does not conduce to a satisfactory safeguarding of the health of the soldiers. When a soldier feels ill, he applies for permission to attend these parades. He need not do so, and in many instances he actually does not. In this way, the men who attend the parades include those who join chiefly because they find an excuse for getting off military duty for a short time, as well as the genuinely ill men. No control is exercised to ensure that all the sick men present themselves at an early stage of the illness. It would appear that this defect lies in the general military administration and not in the administration of the Army Medical Corps. The remedy is simple. It would consist in the authority being given to the medical officers attached to the units to inspect and question the men under their supervision, and after a preliminary examination to draft off to the sick parade those men who need more careful examination and treatment than can be accorded them in the military camp. From a hygienic point of view, we would suggest that vermin inspection should be carried out in the lines, in order that every instance of pediculosis might be detected and dealt with promptly and energetically.

The next point dealt with is an exceedingly difficult one. His Honour has considered the subject of the venereal compound very carefully, and weighed the evidence in regard to the escape of patients (we nearly said, prisoners)

and in regard to the disposal of used dressings. He found that there was laxity in discipline in allowing patients to escape. As Captain Schlink explained, this is entirely a military matter, and if the military authorities require these men to be detained, the restraint must be applied by the military and not by the medical staff, which has more than enough to do in attending to the patients from a medical aspect. His Honour proceeds to advise more stringent measures for this purpose, on the ground that the escape of soldiers affected with venereal disease is a menace to the health of the community. The number of men who escape cannot have been considerable from first to last, since the compound has not accommodated more than 250 at a time, and does not usually contain anything like this number. We have been assured that only a small proportion of the men attempts to escape. Assuming that a steady stream of ten men a week freed themselves from the restraint of the compound and mixed with the general population, we cannot believe that there would be a perceptible increase in the number of infections. If the Department of Public Health introduced restraint of civilians infected with gonorrhœa or syhpilis, the argument might have some force, but since infected prostitutes and males go uncontrolled about the streets of the city, the advent of an extra handful of infections would be as a drop in the ocean.

In regard to the dressings, his Honour unconsciously gives the explanation for the defect and the remedy. He says that since Captain Grigor has been placed in charge of the compound, remedies have been effected. This, in our opinion, proves that before this able officer was told off for this duty, the venereal compound suffered from a wholly insufficient number of medical men to carry out the work. Even since Captain Grigor has been at the compound, a great deal of the work has been done by an undoubtedly efficient sergeant, who was trained for the purpose by the Captain.

To sum up this chapter, we claim that the site of this compound is ill chosen, the restraint is purposeless, and the fact that the authorities do not provide salvarsan, or one of its substitutes for cases in which it would do good is unjust in the extreme.

The recommendations concerning the establishment of a Dental Corps are wholly excellent. We learn that the army biscuit is a severe test even for sound teeth; the men at Gallipoli have found that this ration caused the gums to bleed, and a mixture of biscuit and blood is not an ideal food. It is therefore quite essential that the teeth of recruits should be properly looked after by competent experts, and the offer of the Odontological Association should have been accepted without delay, and acted upon.

The last matter included in the recommendations under the heading of Army Medical and Dental Corps deals with the distinctive colouring of the latrine pans, in order that those in use by patients suffering from venereal diseases may be kept distinct from those intended for other patients. This is qualified in so far as it is put forward as a temporary expedient pending the installation of a septic tank system. No possible exception could be taken to this proposal, but it is not unreasonable to enquire into the argument which impelled his Honour to suggest this. The pans do not or should not come into contact with any part of the men's bodies, and the chances of direct infection is small. It might be urged that the urine of a soldier suffering from gonorrhœa would infect a pan, but even if this were the case, it is difficult to understand how another patient using the same pan would run any risk of infection. Mr. Justice Rich is much too keen a lawyer to recommend anything without good reason, but we must admit that we have failed to discern what the reason for this suggestion is.

In our next issue, it is proposed to analyse the case of Captain Schlink.

(To be continued.)

THE SCHLINK FUND.

There have been four contributions to the Schlink Fund during the past week. In sending his contribution, Lieutenant-Colonel J. Crawford Robertson writes: "We all sympathize with Captain Schlink, and I trust he will not have to put his hand in his pocket." Dr. Schlink's liabilities in connexion with the Liverpool Camp Enquiry amount to close on £300.

	£	s.	d.
Amount previously received	76	1	0
Dr. S. L. Cook..	2	2	0
„ W. Odillo Maher	2	2	0
Sir Herbert Maitland	3	3	0
Lieut.-Col. J. Crawford Robertson	3	3	0
Total	£86	11	0

The following have been nominated for election to the New South Wales Branch of the British Medical Association:—

Dr. R. H. Leeds, Carcoar.
Dr. E. H. Loxton, "Netterley," Wahroonga.
Dr. Victor M. Coppleson, Bondi Road, Bondi.
Dr. C. W. W. Murray, Wentworth Street, Parramatta.
Dr. M. J. Slattery, 50 College Street, Sydney.
Dr. Charles W. Bray, Rabaul.

The death of Dr. Harvey Eustace Astles, of 30 Collins Street, Melbourne, took place on September 30, 1915. Dr. Astles was 71 years of age. He settled in Melbourne in 1899, after having practised in South and Western Australia. He was President of the Western Australian Branch of the British Medical Association, and President of the Dental Board of the same State. In South Australia, he continued to take an active interest in British Medical Association affairs, and was elected President of the Branch. He was a lecturer on clinical medicine at the Melbourne University.

Special Correspondence.

(From our London Correspondent.)

LONDON LETTER.

University College.

An Assembly of the College Faculties was held at University College, Gower Street, on July 1, 1915, for the reception of scholars, medallists, and prizemen. Sir Henry Miers, Principal of the University of London, occupied the chair.

Dr. T. Gregory Foster, the Provost, in the course of his report, stated that the effect upon the College of the war was shown by the fact that whereas at this time last year the total number of students was 2,206, the number this session was 1,270. The roll of those who had undertaken service for the country was as follows:—Navy, 59; Army, 727; other branches, 111: total, 897. Among those whose special services had been recognized was Captain Arthur Martin Leake, R.A.M.C., who was awarded the Victoria Cross during the Boer war, and practically the same honour again during the present campaign. There were thousands of men, either at the front or preparing to go there, who would be serving their country better in the shipyard, the gunshop, at the bench, or by completing their own training. The most patriotic thing that the medical student could do now was to stay at home and become qualified. The same was true, perhaps in a lesser measure, for those who had entered upon a training for one or other of the technical professions, such as engineering and chemistry. The students received conflicting advice from different quarters, and not always consistent advice from the same quarter. For instance, in Parliament the Under-Secretary of State for War gave advice similar to that which he he had just given in regard to medical students. But when one of the medical students wrote to him for advice, he received the following reply: "I have given your letter careful consideration, and I am of opinion that you would perform your duty to your country best by joining some combatant branch of his Majesty's forces." Many of those, who continued their academic work this year, had combined with it military work, mainly by joining the Officers' Training Corps, and it was owing to the existence

of that body that the Universities generally had been able to give substantial military assistance to the country at this time.

While they admitted that the realization of the great scheme of reorganization of the University of London set out in the report of the Commissioners must, in some of its aspects at all events, be delayed, they felt that the war had made it more imperative than ever that, as far as possible, that scheme should be carried out. Organization was the accepted cure for the difficulties in which we, as a people, now found ourselves. The matter was forcibly put by Sir Wilmot Herringham, the ex-Vice-Chancellor, now Consulting Physician to the British Expeditionary Force, in a letter from General Headquarters in France to Sir Alfred Pearce Gould, the present Vice-Chancellor. Sir Wilmot, after insisting that "it was necessary for our safety to spread as widely as possible the understanding of those military principles on which the defence of the country and the Empire must always depend," went on to say: "A University education fails in its object unless it induces both a more intelligent and a more willing devotion to public service. Of all the lessons that we shall learn from our allies and from the enemy, and they can teach us many, none is so impressive or so great as this. The sacrifice, the discipline, the unity of the French and German peoples are an example to us. They have understood from the first what this war meant, and have bent the forces of the nation to carry it out. We are dilettante amateurs compared with them, and we shall be unworthy both of friend and foe until we do the like." The provost referred with regret to the fact that the Principal of the University was leaving to take up the position of Vice-Chancellor of the University of Manchester. They desired to thank him for the kindness and zeal with which he had attended to the affairs of the University and of this College and for the counsel he had so often given them. In the Principal's own words, he had done "seven years' hard" in this University.

Drunkenness and the War.

A Blue Book was issued on July 31, 1915, containing statistics as to the administration and operation of the laws relating to the sale of intoxicating liquor in England and Wales for the year 1914. The fundamental features of this annual series of statistics have been preserved as far as possible, but, under the pressure occasioned by the war, some of the customary tables have been omitted or curtailed. On January 1, 1914, there were in England and Wales 87,660 premises licensed by Justices for the sale of intoxicating liquor for consumption on or off the premises, described in the statistics as on-licenses, and 23,408 premises licensed for sale for consumption off the premises, referred to in the return as off-licenses, giving proportions, according to the estimated population, of 23.50 on-licenses and 6.27 off-licenses, or 29.77 licensed premises per 10,000 persons. In the ten years 1895 to 1904 the average annual decrease in on-licenses was 386. For the nine years 1905-13 the average was 1,313, and during 1914 the decrease was probably about 1,032, making an annual average for the ten years since the Act of 1904 came into operation of about 1,285, and leaving a total of about 86,628 on-licenses at the beginning of the present year. The outbreak of war in August altered so completely the conditions out of which convictions for drunkenness normally arise that comparisons between the figures for 1914 and those for previous years can hardly be made with any degree of safety. The total convictions for drunkenness in England and Wales in 1914 were 183,828, as compared with 188,877 in 1913. In every month of the first half of the year except May the figures were higher than in the previous year, and in every month of the second half of the year they were lower. Whereas the figures for 1913 showed 88,932, or 47% of the total from January to June, and 99,945, or 53% of the total from July to December, the figures for 1914 give 93,869, or 51% of the total from January to June, and 89,959, or 49% of the total from July to December. "To avoid misconception," says the report, "it should perhaps, be repeated that a decrease in convictions for drunkenness may be due to all manner of causes, and does not necessarily or even probably indicate a decrease in drunkenness, still less in excessive drinking."

Anti-typhoid Inoculation.

On July 1, in the House of Commons, Mr. Chancellor, the member for Haggerston, asked the Under-Secretary for War whether he would state the number of cases of and deaths from typhoid fever that had occurred since the outbreak of war up to the latest date available amongst officers and men serving with the British Forces in Europe; and whether he would also state the numbers of the inoculated and non-inoculated cases and deaths.

Mr. Tennant replied as follows: "In the Expeditionary Force in France there have been up to May 22 827 cases of typhoid fever, with 128 deaths. Of these cases 508 occurred among the uninoculated, and of these 106 died. Of the remaining 319 cases, which occurred among the inoculated, 22 were fatal. The House will be interested to know that the ratio of attacks is 14 times and of deaths 42 times greater among the uninoculated men."

Correspondence.

THE DURATION OF GONORRHŒA.

Sir,—In your last issue (page 375) I read: "Many of the soldiers were cured within two weeks and returned to the lines!" I then turned up two sayings of Ricord: "If I should go to hell," said Ricord, "I know what I will be in for: I will find myself surrounded by patients suffering from gonorrhœa who incessantly implore me to cure them." Again, Ricord would say: "That one knows perfectly well when a clap begins, but that it is the privilege of God of being able to tell when it will end."

I then looked up my last 38 cases, and I find that these cases between them accumulated 1855 days of quarantine. This gives an average of 47.5 days per rating. I note that two ratings were 107 and 103 days in quarantine respectively. The great majority of these cases were anterior urethritis. The exigencies of the service let several of these men out of quarantine before I was satisfied that they were cured. Now I am not going to say, because it is not correct in many cases that a man with little or no discharge cannot do his job of work as well as the next man in the firing line. What I am sure of is that most of these men are not cured, and are carriers of Neisser's gonococcus into tracts, virgin and otherwise, and can be the source of untold family misery.

Yours, etc.,
F. HAMILTON KENNY,
Staff Surgeon, R.A.N.,
Naval Depot, Victoria.

October 16, 1915.

Obituary.

JOHN FITZMAURICE GUY LUTHER.

Several weeks ago the news of the death from wounds of Dr. Guy Luther, of Bundaberg, Queensland, reached his friends, and caused dismay. It will be remembered that Dr. Luther volunteered for service, and obtained a commission on October 17, 1914, as Captain in the A.A.M.C. He left Australia with the second Expeditionary Force as Medical Officer attached to the 15th Infantry unit. News of his devotion to duty, bravery, and numerous acts of kindness have filtered through from the front at odd times. When the cable announcing his death arrived in Bundaberg the whole population was stricken with grief.

John Fitzmaurice Guy Luther was born at Limerick, in Ireland, during the Franco-Prussian war. He studied medicine in Dublin, and qualified in 1893, having taken the diploma of the Colleges of Physicians and Surgeons. Shortly after he came out to Australia and settled in Queensland. He obtained the position of Assistant Resident Medical Officer at the Goonda Asylum, and later assisted his brother, who was in practice in Maryborough. In 1898 he settled in Bundaberg, where he built up a large and important practice. He married the eldest daughter of the late Mr. Thomas Mowbray, of Brisbane, and had a family of four children, the youngest of whom is two years of age. He was an ideal regimental officer, brave, courteous, kind, and never sparing himself. He gained the

love of all those with whom he came in contact. In his private practice he was honest to a fault, gentle and skilful. Among his colleagues he was very popular. His loss will be mourned by a very large number of friends, patients and comrades.

Medical Appointments.

Dr. Kevin Byrne has been appointed to the resident staff of the St. Vincent's Hospital, Sydney.

The following appointments were announced by the Board of Health, Victoria, on October 13, 1915:—

Kerang Shire—Dr. A. Y. Nankivell, as Acting Officer of Health for Kerang District, during the absence on active service of Dr. C. H. Johnson.

Kowree Shire—Dr. R. G. Burnard, for Central and West Ridings, and Dr. Bourke for East Riding, in place of Dr. Halahan (resigned) and Dr. Hughston (deceased).

Mount Rouse Shire—Dr. (Miss) Christina H. Reid, as Acting Officer of Health for the whole Shire, in place of Dr. A. C. Irving, Officer of Health for the Northern portion (resigned).

Werribee Shire—Dr. C. R. Adcock till December 31, 1915, in place of Dr. R. A. A. Manly (deceased).

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page ix.

Queen's Memorial Infectious Diseases Hospital, Fairfield, Senior Assistant Medical Officer.

Proceedings of the Australasian Medical Boards.

VICTORIA.

The following have been registered under the provisions of the "Medical Act, 1890," and the "Medical Act, 1906," as duly qualified medical practitioners:—

William Henry Collins, Ivanhoe, M.B. et. Ch.B. Melb., 1914.

George Stephenson Elliott, "Gladwood," Combermere Street, Essendon, M.B. et. Ch.B. Melb., 1915.

Howard Maxwell James, Warburton, M.B., et. Ch.B. Melb., 1915.

Robert Percy Young, Scott Street, Cavendish, M.B. et. Ch.B. Melb., 1914.

John Forrest Gardner, St. Peter's, South Australia, M.B. et Ch.B. Adelaide, 1914.

Births, Marriages, and Deaths.

The charge for inserting advertisements of Births, Marriages and Deaths is 5s., which sum should be forwarded in money orders or stamps with the notice, not later than the first post on Tuesday morning, in order to ensure insertion in the current issue.

BIRTH.

GRAHAM.—On September 24, 1915, to Dr. and Mrs. R. V. Graham, of Lismore—a daughter.

Diary for the Month.

Oct. 26.—N.S.W. Branch, B.M.A., Organization and Science Committee; Medical Politics Committee.
Oct. 26.—Vic. Branch, B.M.A., Eye and Ear Section.
Oct. 27.—Vic. Branch, B.M.A., Council.
Oct. 27.—S. & S.P.M. Assoc., Annual Meeting.
Oct. 28.—S. Aust Branch, B.M.A., Monthly.
Oct. 29.—N.S.W. Branch, B.M.A., Ordinary.
Oct. 29.—Melb. Hosp. Clin. Soc.
Oct. 30.—Vic. Branch, B.M.A., Nomination Papers for Election to Offices issued (returnable Nov. 10),
Nov. 4.—North-East. Med. Assoc. (N.S.W.), Grafton.
Nov. 5.—Queensland Branch, B.M.A., Monthly.
Nov. 8.—South Australian Branch, Council.
Nov. 9.—Tasmania Branch, B.M.A., Monthly and Council.
Nov. 10.—Victorian Branch, B.M.A., Monthly.
Nov. 10.—Melbourne Pediatric Society.
Nov. 11.—Victorian Branch, B.M.A., Council.
Nov. 12.—N.S.W. Branch, B.M.A., Clinical.
Nov. 16.—N.S.W. Branch, B.M.A., Executive and Finance Committee, Ethics Committee.
Nov. 17.—Western Australian Branch, B.M.A., Monthly.
Nov. 19.—Queensland Branch, B.M.A., Council.

Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
QUEENSLAND. (Hon. Sec. B.M.A. Building, Adelaide Street, Brisbane).	Brisbane United F.S. Institute.
WESTERN AUSTRALIA. (Hon. Sec. 230 St. George's Terrace, Perth).	Swan District Medical Officer. All Contract Practice Appointments in W.A.
NEW SOUTH WALES. (Hon. Sec. 30-34 Elizabeth Street, Sydney).	Australian Natives Association. Balmain United F.S. Dispensary. Burwood District F.S. Institute. Canterbury United F.S. Dispensary. Goulburn F.S. Association. Leichhardt and Petersham Dispensary. M.U. Oddfellows Med. Inst., Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. Mullumbimby District Friendly Societies. N.S.W. Ambulance Association and Transport Brigade. N. Sydney United F.S. People's Prudential Benefit Society. Phœnix Mutual Provident Society. F.S. Lodges at Braidwood. F.S. Lodges at Casino. F.S. Lodges at Lithgow. F.S. Lodges at Mudgee. F.S. Lodges at Orange. F.S. Lodges at Parramatta, Penrith, and Auburn. F.S. Lodges at Wellington. Newcastle Collieries— Killingworth. Seaham Nos. 1 and 2. West Wallsend.
SOUTH AUSTRALIA. (Hon. Sec. 3 North Terrace, Adelaide).	The F.S. Medical Assoc. Incorp., Adelaide.

EDITORIAL NOTICES.

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